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Space Station Integrated
Propulsion and Fluid Systems Study

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Hardware Catalog

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List of Acronyms

ECLSS	Environmental Control and Life Support System
ECLSS, ACS	Atmosphere Control and Supply Subsystem
ECLSS, AR	Atmospheric Revitalization Subsystem
ECLSS, FDS	Fire Detection and Suppression Subsystem
ECLSS, THC	Temperature and Humidity Control Subsystem
ECLSS, WM	Waste Management Subsystem
ECLSS, WRM	Water Recovery and Management Subsystem
JEM	Japanese Experimental Module
JEM, ELM	Experiment Logistics Module
TCS	Thermal Control System
INS	Integrated Nitrogen System
INS, DS	Distribution Subsystem
INS, RS	Resupply Subsystem
INS, SS	Storage Subsystem
IWFS	Integrated Waste Fluids System
IWS	Integrated Water System
SFHe	Super Fluid Helium
SFH _T	Super Fluid Helium Tanker
USL	United States Laboratory
USL, PFS	Process Fluids Storage Subsystem
USL, PMMS	Process Materials Management Subsystem
USL, PWH	Process Waste Handling Subsystem
USL, VVS	Vacuum Vent Subsystem

1.0 INTRODUCTION

This Databook addresses the integration of fluid systems of the Space Station program. It includes a catalog of components required for the Space Station elements fluid systems information on potential hardware commonality.

The catalog of components consists of four major parts. The first part lists the components defined for all of the fluid systems identified in EP 2.1, Space Station Program Fluid Systems Configuration Databook. The components are cross-referenced in three sections of this databook. Section 2.1 lists the components by the fluid system they are used in. Section 2.2 lists the components by component type. Section 2.3 lists by the type of fluid/media that is handled by the component.

The next part of the component catalog provides a detailed description of the individual component. This section (2.4) is made up of data retrieved from Martin Marietta Denver Aerospace component data base.

The third part of the component catalog is an assessment of propulsion hardware technology requirements. Section 2.5 lists components that were identified during the study as requiring development prior to flight qualification.

Finally, Section 2.6 presents the results of the evaluation of commonality between components. The specific requirements of each component has been reviewed and all cases where a single component could meet multiple requirements are listed.

2.0 FLUID SYSTEMS HARDWARE CATALOGUE

The hardware catalog is a compilation of all the hardware items making up the systems which are described in detail in EP 2.1 Space Station Program Fluid Systems Configuration Databook. This catalog is organized into listings as follows:

- Section 2.1 Components Listed by Fluid System
- Section 2.2 Components Listed by Component Type
- Section 2.3 Components Listed by Fluid/Media Usage
- Section 2.4 Data Sheets by Individual Component
- Section 2.5 Technology Assessment
- Section 2.6 Commonality Assessment

The variables are defined as follows: each component has an item number assigned to it with a type and subtype which describe it. Where a common hardware usage is possible, more than one item number will be listed per component sheet number. The media listed is the media which is of the most concern with regard to material compatibility, for example, if a service valve for pressurant gases is also exposed to oxidizers then the fluid usage would call for oxidizers, not GHe. The maximum expected operating pressure and port size are dictated by design, while mass is either an estimate where no specific vendor part is identified, or is an actual weight where the specific vendor part can be identified. Vendor names and part numbers are identified where the design calls for a specific piece of hardware or was assigned a part number because of a best fit with the Martin Marietta propulsion component database.

2.1 FLUID SYSTEMS COMPONENT LISTINGS BY SYSTEM

The component lists in this section, Tables 2.1-1 through 2.1-6 list the component requirements of each of the Space Station Fluid Systems. These include the following elements:

- 1) ECLSS
- 2) INS
- 3) IWFS
- 4) IWS
- 5) SFHT
- 6) USL

TABLE 2.1-1 FLUID SYSTEM COMPONENT LIST - ECLSS

ITEM	PROGRAM APPLICATION	COMPONENT TYPE	QUAN RECD	SIZE (in)	PRESSURE HEAD (psi@4)	USAGE MEDIA	APPROX MASS (lb)	VENDOR NAME	VENDOR PART NUMBER
115	ECLSS, NCS	MISC. CONTROL, N2 RESUPPLY PRESSURE PRESSURE VESSEL,	1	TBD	TBD	GN2	57.0	TBD	
114	ECLSS, ACS	MISC. REFRIGERATOR/FREEZER	2	TBD	TBD	LN2	170.0	TBD	
113	ECLSS, ACS	VALVE, RELIEF	3	TBD	TBD	TBD	546.0	TBD	
88	ECLSS, ACS	MISC. PRESSURE CONTROL SYSTEM	5	.25	14.9	AIR	1.0	TBD	
89	ECLSS, ACS	VALVE, EQUALIZATION	5	.375	250	CO2, GN2	50.0	TBD	
90	ECLSS, ACS	REGULATOR, DOWNSTREAM	9	TBD	14.9	AIR	6.0	TBD	
87	ECLSS, ACS	MISC. SORBENT BED	2	.375	750/30	GN2	1.0	TBD	
93	ECLSS, AR	FILTER, AERONICS PARTICULATE	4	TBD	30	AIR	90.0	TBD	
92	ECLSS, AR	MISC. ELECTROLYSIS UNIT, KOM	4	TBD	14.9	AIR	17.0	TBD	
97	ECLSS, AR	MISC. MOLECULAR SIEVE, 4-800	4	TBD	200	H2O, CO2, GN2	232.0	TBD	
96	ECLSS, AR	MISC. CO2 REDUCTION, POOR	4	TBD	30	AIR, CO2	322.0	TBD	
94	ECLSS, AR	MISC. CATALYTIC OXIDIZER	4	.25	30	AIR	324.0	TBD	
99	ECLSS, AR	FILTER, BACTERIA/PARTICULATE	6	TBD	30	AIR	60.0	TBD	
95	ECLSS, AR	MISC. MONITOR, ATMOSPHERE	7	TBD	14.9	AIR	60.0	TBD	
98	ECLSS, AR	MISC. CONTROLLER, PRO	5	TBD	14.9	AIR	57.0	TBD	
101	ECLSS, FDS	MISC. PRESSURE VESSEL, FIRE SUPPRESSANT	7	N/A	500	HALON 1301	2.0	TBD	
100	ECLSS, FDS	MISC. CABIN COOLING PIG	76	TBD	500	HALON 1301	6.0	TBD	
91	ECLSS, THC	MISC. BRINE STORAGE	7	TBD	14.9	AIR	123.0	TBD	
116	ECLSS, NMN	MISC. FECAL STORAGE	6	TBD	TBD	URINE BRINE	33.0	TBD	
117	ECLSS, NMN	MISC. FECAL STORAGE	1	TBD	TBD	FEES	52.0	TBD	
104	ECLSS, NMN	PRESSURE VESSEL, EMERGENCY WASH WATER	2	TBD	44.9	H2O	128.0	TBD	
107	ECLSS, NMN	MISC. PROCESSING UNIT, WASTE HYGIENE	2	TBD	44.9	H2O	202.0	TBD	
111	ECLSS, NMN	PRESSURE VESSEL, WASTE HYGIENE WATER	2	TBD	44.9	H2O	292.5	TBD	
110	ECLSS, NMN	PRESSURE VESSEL, PROCESSED HYGIENE WATER	2	TBD	44.9	H2O	315.0	TBD	
108	ECLSS, NMN	MISC. PROCESSING UNIT, POTABLE WATER	4	TBD	44.9	H2O	77.0	TBD	
105	ECLSS, NMN	PRESSURE VESSEL, CONDENSATE WATER	2	TBD	44.9	H2O	108.0	TBD	
102	ECLSS, NMN	PRESSURE VESSEL, POTABLE WATER	4	TBD	44.9	H2O	166.0	TBD	
109	ECLSS, NMN	MISC. EYEWASH	1	TBD	44.9	H2O	1.0	TBD	
112	ECLSS, NMN	PRESSURE VESSEL, HYGIENE WATER	1	TBD	44.9	H2O	1000.0	TBD	
103	ECLSS, NMN	MISC. DISPENSER, POTABLE WATER	2	TBD	44.9	H2O	41.0	TBD	
106	ECLSS, NMN	MISC. MONITOR, WATER QUALITY	6	TBD	44.9	H2O	60.0	TBD	

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TABLE 2.1-2 FLUID SYSTEM COMPONENT LIST - INS

ITEM	PROGRAM APPLICATION	COMPONENT TYPE	QUANTITY NEEDED	SIZE (In)	PRESSURE RATED (psi)	USAGE MEDIA	APPROX. MASS (lb)	VENDOR NAME	VENDOR PART NUMBER
143	INS, DS	REGULATOR, ELECTRONIC, W/RELIEF	2	.375	4000/750	GN2	4.0	TBD	
144	INS, DS	SENSOR, PRESSURE	2	.25	4000	GN2	0.6	EATON CONSOLIDATED CONTROLS CORP.	41SC191-2000A1 M00
145	INS, DS	SENSOR, PRESSURE	2	.25	750	GN2	0.4	INO DELAVAL INC., CRC INSTA. DIV.	61SS05 MODIFIED
146	INS, DS	SENSOR, TEMPERATURE	2	.25	750	GN2	0.1	TBD	
147	INS, DS	DISCONNECT,	6	TBD	4000	GN2	TBD	TBD	
148	INS, DS	FILTER, INLINE	6	TBD	4000	GN2	TBD	TBD	
149	INS, DS	VALVE, SOLENOID, LATCHING	3	TBD	750	GN2	TBD	TBD	
150	INS, DS	VALVE, SOLENOID, LATCHING	3	.25	4000	GN2	1.6	TBD	
151	INS, DS	VALVE, TORQUE MOTOR	12	.25	750	GN2	1.6	TBD	
152	INS, DS	VALVE, TORQUE MOTOR	4	.25	4000	GN2	1.6	TBD	
153	INS, RS	VALVE, MANUAL.. SERVICE	2	.5	4000	GN2	2.0	VACCO INDUSTRIES	VIE10130-01
154	INS, RS	SENSOR, TEMPERATURE	12	.25	4000	GN2	0.2	TBD	
155	INS, RS	SENSOR, PRESSURE	16	.25	4000	GN2	0.6	EATON CONSOLIDATED CONTROLS CORP.	41SC191-2000A1 M00
156	INS, RS	DISCONNECT,	4	TBD	4000	GN2	TBD	TBD	
157	INS, RS	FILTER, INLINE	4	TBD	4000	GN2	TBD	TBD	
158	INS, RS	MISC. VENT ASSY, NON-PROPELLIVE	12	TBD	4000	GN2	TBD	TBD	
159	INS, RS	VALVE, RELIEF W/BD	12	TBD	4000	GN2	1.6	TBD	
160	INS, RS	PRESSURE VESSEL,	4	.25	4000	GN2	1.6	TBD	
161	INS, RS	VALVE, TORQUE MOTOR	24	.25	4000	GN2	1.6	TBD	
162	INS, RS	VALVE, SOLENOID, LATCHING	24						
163	INS, SS	SENSOR, TEMPERATURE	6	.25	4000	GN2	0.2	TBD	
164	INS, SS	SENSOR, PRESSURE	10	.25	4000	GN2	0.4	EATON CONSOLIDATED CONTROLS CORP.	41SC191-2000A1 M00
165	INS, SS	DISCONNECT,	6	TBD	4000	GN2	TBD	TBD	
166	INS, SS	FILTER, INLINE	6	TBD	4000	GN2	TBD	TBD	
167	INS, SS	MISC. VENT ASSY, NON-PROPELLIVE	6	TBD	4000	GN2	TBD	TBD	
168	INS, SS	VALVE, RELIEF W/BD	6	.25	4000	GN2	TBD	TBD	
169	INS, SS	PRESSURE VESSEL,	6	TBD	4000	GN2	TBD	TBD	
170	INS, SS	VALVE, SOLENOID, LATCHING	12	.25	4000	GN2	1.6	TBD	
171	INS, SS	VALVE, TORQUE MOTOR	6	.25	4000	GN2	1.6	TBD	

TABLE 2.1-3 FLUID SYSTEM COMPONENT LIST - IWFS

ITEM	PROGRAM APPLICATION	COMPONENT TYPE	QUANTITY INDEX	SIZE (in)	PRESSURE MODE (psi)	USAGE MEDIA	APPROX MASS (lb)	VENDOR NAME	VENDOR PART NUMBER
180	IWFS,	VALVE, ELECTRIC	24	.25	30	H2O	1.4	NIGHT COMPONENTS INC.	15613
184	IWFS,	FILTER, INLINE	4	.5	300	ALL	0.5	TBD	592002-3 4 -4
185	IWFS,	DISCONNECT,	16	.375	15	OXIDIZERS	0.4	SYMETRICS INC.	
201	IWFS,	PRESSURE VESSEL,	2	.5	300	OXIDIZERS	101.8	TBD	
202	IWFS,	PRESSURE VESSEL,	4	.25	300	REDUCERS	101.8	TBD	
203	IWFS,	PRESSURE VESSEL,	1	.25	30	H2O	42.0	TBD	
204	IWFS,	PRESSURE VESSEL, ACCUMULATORS	2	.25/.5	35	REDUCERS	6.3	TBD	
205	IWFS,	PRESSURE VESSEL, ACCUMULATORS	1	.25	TBD	H2O	3.2	TBD	
206	IWFS,	MFC, COMPRESSOR	2	.5	300	OXIDIZERS	30.0	TBD	
207	IWFS,	MFC, COMPRESSOR	2	.25	300	REDUCERS	30.0	TBD	
208	IWFS,	MFC, PUMP	2	TBD	TBD	H2O	35.0	TBD	
178	IWFS,	VALVE, ELECTRIC	2	.25	800	GH2	1.5	TBD	
179	IWFS,	REGULATOR, DOWNSTREAM	2	.25	30	GN2	0.5	NIGHT COMPONENTS INC.	15611-2
180	IWFS,	VALVE, ELECTRIC	6	.25	180	MOOG, SPACE PRODUCTS DIVISION	53-159		
181	IWFS,	VALVE, ELECTRIC	2	.25	15.0	REDUCERS	1.5	NIGHT COMPONENTS INC.	15603-1
175	IWFS,	VALVE, ELECTRIC	40	.25	300/75	OXIDIZERS	0.3	EATON CONSOLIDATED CONTROLS CORP.	13890 MODIFIED
176	IWFS,	VALVE, RELIEF	2	.25	ALL	ALL	1.5	NIGHT COMPONENTS INC.	15915
182	IWFS,	VALVE, RELIEF	6	.5	15	OXIDIZERS	0.6	NIGHT COMPONENTS INC.	15751
183	IWFS,	VALVE, RELIEF	6	.25	300	REDUCERS	2.0	TBD	
185	IWFS,	VALVE, RELIEF	1	.25	30	H2O	2.0	TBD	
186	IWFS,	VALVE, CHECK	12	.5	300	OXIDIZERS	0.2	MAROTTA SCIENTIFIC CONTROLS	804232
187	IWFS,	VALVE, CHECK	14	.25	300	REDUCERS	0.5	VACCO INDUSTRIES	4513779
188	IWFS,	VALVE, CHECK	6	.25	30	H2O	0.5	VACCO INDUSTRIES	V1010746-01
189	IWFS,	REGULATOR, DOWNSTREAM	2	.25	300/75	REDUCERS	0.3	EATON CONSOLIDATED CONTROLS CORP.	13890 MODIFIED
191	IWFS,	REGULATOR, DOWNSTREAM	6	.25	750/30	GH2	0.6	AERODYNE CONTROLS CORP.	3046-5-000 MODIFI
182	IWFS,	SENSOR, PRESSURE	42	.25	300	MEASUREMENTS	0.5	TELLEDYNE TABER	2403-200
56	IWFS,	PRESSURE VESSEL, ACCUMULATORS	2	.25/.5	35	OXIDIZERS	0.3	TBD	
183	IWFS,	SENSOR, PRESSURE	14	.25	30	H2O	0.5	MOOG, CARLETON GROUP	2311-0001-5
186	IWFS, ATT PAYLOADS	DISCONNECT,	2	.25	800	REDUCERS	0.6	SYMETRICS INC.	502040-1011 4 -301
187	IWFS, ECSS	DISCONNECT,	2	.25	180	REDUCERS	0.6	SYMETRICS INC.	502040-1011 4 -301
200	IWFS, INS	DISCONNECT,	4	.25	750	GH2	0.6	SYMETRICS INC.	502040-1011 4 -301
199	IWFS, INS	DISCONNECT,	16	.25	30	H2O	0.6	SYMETRICS INC.	502040-1011 4 -301
196	IWFS, LABS	DISCONNECT,	12	.25	15	REDUCERS	0.6	SYMETRICS INC.	502040-1011 4 -301

TABLE 2.1-4 FLUID SYSTEM COMPONENT LIST - IWS

ITEM	PROGRAM APPLICATION	COMPONENT TYPE	QUANTITY REQD	SIZE (in)	PRESSURE HEAD (psia)	USAGE MEDIA	APPROX MASS (lb)	VENDOR NAME	VENDOR PART NUMBER
209	IWS,	VALVE, ELECTRIC	60	TBD	30	H2O	3.0	TBD	TBD
210	IWS,	VALVE, RELIEF	6	.25	30	H2O	1.0	TBD	TBD
211	IWS,	VALVE, CHECK	6	.25	30	H2O	0.5	VACCO INDUSTRIES	V1010146-01
212	IWS,	REGULATOR, DOWNSTREAM	4	.25	750/30	GN2	0.4	AERODYNE CONTROLS CORP.	3066-5-000 MODIFIE
213	IWS,	SENSOR, PRESSURE	20	.25	30	H2O	0.5	HODG, CARLETON GROUP	2731-0001-5
214	IWS,	SENSOR, TEMPERATURE	20	.25	30	H2O	0.1	TBD	TBD
215	IWS,	FILTER, INLINE	TBD	TBD	30	H2O	1.0	TBD	TBD
216	IWS,	KIT, HEATER	N/A	30.5	N/A	H2O	0.5	TBD	TBD
217	IWS,	DISCONNECT,	4	TBD	30	H2O	TBD	TBD	TBD
218	IWS,	PRESSURE VESSEL,	6	TBD	30	H2O	76.0	TBD	TBD

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TABLE 2.1-5 FLUID SYSTEM COMPONENT LIST - SFHT

ITEM	PROGRAM APPLICATION	COMPONENT TYPE	QUAN NOD	SIZE (in)	PRESSURE ADP (psi)	USAGE MEDIUM	APPLIC MASS (lb)	VENDOR NAME	VENDOR PART NUMBER
1741	SFHT,	SENSOR, FLOW METER, GAS	1	.375	VACUUM	SFHE	1.0	TBD	
1733	SFHT,	SENSOR, FLOW METER, LIQUID	2	1.0	VACUUM	SFHE	1.0	TBD	
1721	SFHT,	SENSOR, MASS METER	1	TBD	VACUUM	SFHE	0.1	TBD	
1711	SFHT,	SENSOR, TEMPERATURE	15	.25	VACUUM	SFHE	0.2	TBD	
1671	SFHT,	PRESSURE VESSEL, ISOLATED	1	MULTIPLE	VACUUM	SFHE	750.0	TBD	
1681	SFHT,	PRESSURE VESSEL, STIFFENED MONOCOCHE	1	MULTIPLE	VACUUM	SFHE	1500.0	TBD	
1691	SFHT,	DISCONNECT,	2	1.0	VACUUM	SFHE	2.0	TBD	
1501	SFHT,	DISCONNECT, EMERGENCY	2	1.0	VACUUM	SFHE	3.0	TBD	
1511	SFHT,	HSC, FLEX HOSE	2	1.0	VACUUM	SFHE	0.0	TBD	
1521	SFHT,	VALVE, SOLENOID, LATCHING N/B/P	6	.375	VACUUM	SFHE	1.5	TBD	
1531	SFHT,	VALVE, SOLENOID, LATCHING N/B/P	22	1.0	VACUUM	SFHE	4.0	TBD	
1541	SFHT,	VALVE, SOLENOID, LATCHING	4	1.0	VACUUM	SFHE	3.0	TBD	
1551	SFHT,	VALVE, MANUAL, SHUT-OFF	1	1.0	VACUUM	SFHE	1.0	TBD	
1693	SFHT,	HSC, HEAT EXCHANGER	1	MULTIPLE	VACUUM	SFHE	3.0	TBD	
1641	SFHT,	HSC, POROUS PLUG	1	1.0	VACUUM	SFHE	1.2	TBD	
1671	SFHT,	HSC, POROUS PLUG	1	.375	VACUUM	SFHE	0.3	TBD	
1661	SFHT,	HSC, PUMP, VACUUM GAGE ION	1	.5	VACUUM	SFHE	3.0	TBD	
1651	SFHT,	HSC, PUMP, VACUUM	1	.375	VACUUM	SFHE	0.0	TBD	
1641	SFHT,	HSC, PUMP, FEP	2	1.0	VACUUM	SFHE	0.4	TBD	
1631	SFHT,	HSC, VENT ASSY, NON-PROPELATIVE	1	MULTIPLE	VACUUM	SFHE	0.5	TBD	
1621	SFHT,	HSC, VENT ASSY, NON-PROPELATIVE	1	.375	VACUUM	SFHE	0.3	TBD	
1611	SFHT,	HSC, VENT ASSY, NON-PROPELATIVE	1	1.0	VACUUM	SFHE	0.3	TBD	
1601	SFHT,	HSC, BURST DISK	2	1.0	VACUUM	SFHE	0.9	TBD	
1591	SFHT,	VALVE, RELIEF	1	1.0	VACUUM	SFHE	2.0	TBD	
1581	SFHT,	VALVE, RELIEF	2	1.0	VACUUM	SFHE	3.0	TBD	
1571	SFHT,	VALVE, SEAL-OFF, VACUUM	4	0.5	VACUUM	SFHE	0.5	TBD	
1561	SFHT,	VALVE, SEAL-OFF, VACUUM	1	1.0	VACUUM	SFHE	1.0	TBD	
1501	SFHT,	SENSOR, PRESSURE	5	.25	VACUUM	SFHE	0.8	TBD	

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TABLE 2.1-6 FLUID SYSTEM COMPONENT LIST - USL

ITEM	PROGRAM APPLICATION	COMPONENT TYPE	QUANTITY REQUIRED	SIZE (in)	PRESSURE HEAD (psi)	USAGE MEDIA	AIR/FLUID MASS (lb)	VENDOR NAME	VENDOR PART NUMBER
35	USL, PFS	MISC. FLEX HOSE	40	.25	50	GHE, AR	0.2	TBD	
18	USL, PFS	SENSOR, PRESSURE	2	.25	3000	GHE, AR	0.5	STATHAM DIVISION, SOLATION	CZ2326/A MODIFIED
17	USL, PFS	VALVE, CHECK	2	.375	100	H2O	0.9	TBD	
16	USL, PFS	MISC. WATER PROCESSOR	1	.375	100	H2O	66.2	TBD	
15	USL, PFS	PRESSURE VESSEL, PROCESS WATER	1	.375	100	H2O	1040.3	TBD	
14	USL, PFS	FILTER, INLINE	1	.375	100	H2O	5.5	TBD	
13	USL, PFS	SENSOR, FLOW METER	2	.375	100	H2O	2.0	TBD	
12	USL, PFS	MISC. FLEX HOSE	1	.375	100	H2O	1.1	TBD	
11	USL, PFS	DISCONNECT,	12	.25	3000	GHE, AR	0.6	PTI TECHNOLOGIES, INC.	1537191-4
10	USL, PFS	VALVE, CHECK	1	.25	3000	GHE, AR	0.7	CIRCLE SEAL CONTROLS	CZ27A-4Q
9	USL, PFS	VALVE, ELECTRIC	12	.25	3000	GHE, AR	1.5	AMETEK, STRATA DIVISION	4135
8	USL, PFS	VALVE, FLOW RESTRICTOR	2	.375	3000	GHE, AR	0.2	TBD	
7	USL, PFS	MISC. FLEX HOSE	1	.375	50	H2O	0.4	TBD	
6	USL, PFS	SENSOR, TEMPERATURE	2	.25	3000	GHE, AR	0.2	TBD	
34	USL, PFS	VALVE, ELECTRIC	36	.25	50	GHE, AR	0.5	WEIGHT COMPONENTS INC.	15611-2
33	USL, PFS	DISCONNECT,	36	.375	100	H2O	0.4	SYMETRICS INC.	592002-3 4 - 4
32	USL, PFS	VALVE, ELECTRIC	47	.375	100	H2O	1.7	NOOC, SPACE PRODUCTS DIVISION	52-170
30	USL, PFS	DISCONNECT,	44	.25	100	H2O	0.6	SYMETRICS INC.	502040-0114-301
29	USL, PFS	PRESSURE VESSEL, PORTABLE	10	.25	2000	ALL BUT H2O	12.5	TBD	
28	USL, PFS	PRESSURE VESSEL,	6	.25	3000	AN	36.4	TBD	
27	USL, PFS	PRESSURE VESSEL,	6	.25	3000	GHE	26.0	TBD	
25	USL, PFS	SENSOR, QUALITY METER	1	.375	100	H2O	2.2	TBD	
24	USL, PFS	REGULATOR, DOWNSTREAM	2	.25	3000/50	GHE, AR	1.6	FUTURECRAFT CORP.	400236 MODIFIED
23	USL, PFS	MISC. PUMP	1	.375	100	H2O	11.4	TBD	
22	USL, PFS	SENSOR, DELTA PRESSURE	1	.375	100	H2O	0.5	TBD	
21	USL, PFS	PRESSURE VESSEL, STORAGE, CONT.	1	.375	50	H2O	15.4	TBD	
20	USL, PFS	VALVE, FLOW RESTRICTOR	1	.375	100	H2O	0.3	TBD	
19	USL, PFS	PRESSURE VESSEL,	1	.375	100	H2O	33.1	TBD	
58	USL, PHM	DISCONNECT,	17	.375	14.7	ALL	0.4	SYMETRICS INC.	592002-3 4 - 4
59	USL, PHM	MISC. CRYO UNIT, LN2 PRODUCTION	1	.25	30	LN2	33.0	TBD	
60	USL, PHM	MISC. FLEX HOSE, TEFLON LINED	30	1.0	14.7	ALL	0.3	TBD	
61	USL, PHM	SENSOR, QUALITY MONITOR	2	.375	TBD	H2O	22.1	TBD	
62	USL, PHM	MISC. TIMES UNIT	1	.375	100	H2O	95.0	WMB110W STANDARD	
63	USL, PHM	SENSOR, TEMPERATURE	1	.25	TBD	H2O	0.1	TBD	
64	USL, PHM	VALVE, ELECTRIC	2	.375	TBD	ALL	1.7	TBD	
65	USL, PHM	DISCONNECT,	10	2.0	14.7	ALL	1.0	TBD	
66	USL, PHM	PRESSURE VESSEL,	1	.375	TBD	BURNE	7.5	TBD	
		SENSOR, PRESSURE	7	.25	TBD	ALL	0.7	TBD	

TABLE 2.1-6 FLUID SYSTEM COMPONENT LIST - USL (CONTINUED)

ITEM	PROGRAM APPLICATION	COMPONENT TYPE	QUAN RECD	SIZE (in)	PRESSURE MEAS (psi)	USAGE MEDIA	APPROX MASS (lb)	VENDOR NAME	VEOR PART NUMBER
671	USL, PHH	MISC., COMPRESSOR, REFRIGERATION	1	.75	300	GHE	1411.1	TBD	
68	USL, PHH	PRESSURE VESSEL, WASTE HOLDING	1	2.0	TBD	ALL	15.0	TBD	
69	USL, PHH	MISC., FLEX HOSE, TEFLO LINED	12	2.0	100	ALL	1.9	TBD	
70	USL, PHH	MISC., PUMP	2	2.0	14.7/100	ALL	22.9	TBD	
71	USL, PHH	VALVE, CHECK	3	.375	TBD	ALL	0.9	TBD	
72	USL, PHH	MISC., FLEX HOSE	4	.75	300	LAE	0.6	TBD	
73	USL, PHH	FILTER, MULTIPLE	1	.375	100	H2O	48.5	TBD	
74	USL, PHH	VALVE, VENT ASSY	2	2.0	TBD	ALL	3.9	TBD	
75	USL, PHH	PRESSURE VESSEL, MATERIAL TRANS. CONT.	1	TBD	TBD	ALL	9.9	TBD	
77	USL, PHH	MISC., PRETREATMENT UNIT, WASTE	2	2.0	100	ALL	10.0	TBD	
78	USL, PHH	MISC., FLEX HOSE, TEFLO LINED	28	1.0	14.7	ALL	0.5	TBD	
49	USL, PHH	SENSOR, TEMPERATURE	14	.25	TBD	ALL	0.1	TBD	
50	USL, PHH	MISC., FLEX HOSE, TEFLO LINED	7	1.0	14.7	ALL	0.8	TBD	
51	USL, PHH	PRESSURE VESSEL,	7	2.0	TBD	ALL	14.0	TBD	
52	USL, PHH	VALVE, RELIEF	5	.25	TBD	ALL	1.5	TBD	
48	USL, PHH	DISCONNECT,	7	.25	TBD	ALL	0.8	SIMETRICS INC.	502040-1011-4-301
47	USL, PHH	SENSOR, PRESSURE	65	.25	TBD	ALL	0.4	AMULITE SEMICONDUCTOR PRODUCTS INC.	BMDE-1100-10
45	USL, PHH	MISC., SEPARATOR, GAS/LIQUID	7	TBD	TBD	ALL	1.2-0	TBD	
44	USL, PHH	PRESSURE VESSEL, LIQUID WASTE	7	.25	TBD	ALL	5.0	TBD	
43	USL, PHH	REGULATOR, DOMESTREAM	14	1.0	3000/15	ALL	2.0	TBD	
42	USL, PHH	PRESSURE VESSEL, WASTE CONTAINMENT	7	.25	TBD	ALL	18.0	TBD	
41	USL, PHH	SENSOR, FLOW METER	14	TBD	14.7	ALL	0.8	TBD	
40	USL, PHH	MISC., DIFFUSER, SUCTION	14	1.0	300	ALL	0.4	TBD	
39	USL, PHH	FILTER, INLINE	13	TBD	TBD	ALL	1.0	TBD	
38	USL, PHH	VALVE, ELECTRIC	50	1.0	3000	ALL	2.2	AMETEK, STRATA DIVISION	525-503
37	USL, PHH	DISCONNECT,	101	1.0	14.7	ALL	1.0	TBD	
36	USL, PHH	VALVE, CHECK	6	.25	TBD	ALL	0.6	TBD	
53	USL, PHH	VALVE, RELIEF	2	TBD	TBD	ALL	1.9	TBD	
54	USL, PHH	ENGINE, BURNER, CATALYTIC	2	2.0	TBD	TBD	60.0	TBD	
55	USL, PHH	PRESSURE VESSEL, WASTE GAS	2	2.0	TBD	ALL	703.4	TBD	
57	USL, PHH	MISC., PUMP, VACUUM	3	2.0	.25 TON/14.7	ALL	580.1	TBD	
A1	USL, PHH	MISC., VACUUM UNIT, PORTABLE	1	TBD	TBD	ALL	10.0	TBD	
41	USL, IVS	VALVE, ELECTRIC	4	6.0	.25 (TON)	ALL	15.0	TBD	
1	USL, IVS	SENSOR, PRESSURE	2	.25	.25 (TON)	ALL	1.9	TBD	
51	USL, IVS	VALVE, MANUAL, SHUT-OFF	2	6.0	.25 (TON)	ALL	0.7	TBD	
2	USL, IVS	VALVE, MANUAL, SHUT-OFF	22	2.0	.25 (TON)	ALL	1.4	TBD	
3	USL, IVS	DISCONNECT,	22	2.0	.25 (TON)	ALL	1.6	TBD	

2.2 FLUID SYSTEM HARDWARE LISTING BY COMPONENT TYPE

Tables 2.2-1 through 2.2-8 in this section list the components by component type.

Orbital Propulsion Assembly

TABLE 2.2-1 FLUID SYSTEM HARDWARE - DISCONNECTS

COMPONENT TYPE	SUB-TYPE	SHEET ITEM NO.	PROGRAM APPLICATION	USAGE (MEDIA)	PRESSURE HEAD (PSIA)	PORT SIZE (IN)	APPROX. MASS (LB)	QUANTITY REQUIRED	VENDOR	VENDOR PART NUMBER
DISCONNECT		1 198	INSTR. ATT PAYLOADS	REDUCERS	800	.25	0.0	2	SYMETRICS INC.	592040-1011 4 -3012
DISCONNECT		1 197	INSTR. ECLS	REDUCERS	180	.25	0.0	2	SYMETRICS INC.	592040-1011 4 -3012
DISCONNECT		1 199	INSTR. INS	H2O	30	.25	0.0	16	SYMETRICS INC.	592040-1011 4 -3012
DISCONNECT		1 196	INSTR. LARS	REDUCERS	15	.25	0.0	12	SYMETRICS INC.	592040-1011 4 -3012
DISCONNECT		1 30	USL .PFS	H2O	100	.25	0.0	44	SYMETRICS INC.	592040-1011 4 -3012
DISCONNECT		1 200	INSTR .INS	CH4	750	.25	0.0	4	SYMETRICS INC.	592040-1011 4 -3012
DISCONNECT		1 40	USL .PMH	ALL	14.7	.25	0.0	7	SYMETRICS INC.	592040-1011 4 -3012
DISCONNECT		2 11	USL .PFS	CH4, AR	3000	.25	0.4	12	PTI TECHNOLOGIES, INC.	7537191-4
DISCONNECT		3 50	USL .PMH	ALL	14.7	.375	0.4	17	SYMETRICS INC.	592002-3 4 -4
DISCONNECT		3 195	INSTR .	CH4/15%N2	15	.375	0.4	16	SYMETRICS INC.	592002-3 4 -4
DISCONNECT		3 33	USL .PFS	H2O	100	.375	0.4	36	SYMETRICS INC.	592002-3 4 -4
DISCONNECT		4 37	USL .PMH	ALL	14.7	1.0	1.0	101	TBD	TBD
DISCONNECT		5 149	SEAT .	AIR	VACUUM	1.0	2.0	2	TBD	TBD
DISCONNECT		6 64	USL .PMH	ALL	14.7	2.0	1.0	10	TBD	TBD
DISCONNECT		6 3	USL .VVS	ALL	.25 (TOTAL)	2.0	1.0	22	TBD	TBD
DISCONNECT		7 217	INS .	H2O	30	TBD	4	TBD	TBD	TBD
DISCONNECT		8 142	INS .INS	CH4	4000	TBD	1	TBD	TBD	TBD
DISCONNECT		8 134	INSTR .BS	CH4	4000	TBD	0	TBD	TBD	TBD
DISCONNECT		8 125	INSTR .BS	CH4	4000	TBD	4	TBD	TBD	TBD
DISCONNECT	EMERGENCY	9 150	SEAT .	SEAT	VACUUM	1.0	3.0	2	TBD	TBD

TABLE 2.2-2 FLUID SYSTEM HARDWARE - ENGINES

COMPONENT TYPE	SUB-TYPE	SHEET ITEM NO.	PROGRAM APPLICATION	USAGE (MEDIA)	PRESSURE HEAD (PSIA)	PORT SIZE (IN)	APPROX. MASS (LB)	QUANTITY REQUIRED	VENDOR	VENDOR PART NUMBER
ENGINE	MUNIC. CATALYTIC	10 54	USL .PMH	TBD	TBD	2.0	60.0	2	TBD	TBD

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TABLE 2.2-3 FLUID SYSTEM HARDWARE - FILTERS

COMPONENT TYPE	SUB-TYPE	SHIELD ITEM NO.	PROGRAM APPLICATION	USAGE (MEDIA)	PRESSURE DROP (PSIA)	APPROX. MASS (LB.) REQUIRED	PORT SIZE (IN)	VENDOR	VENDOR PART NUMBER
FILTER	AVIONICS PARTICULATE	11	92	EC123 , AIR	AIR	14.9	TBD	TBD	TBD
FILTER	BACTERIA/PARTICULATE	12	95	EC123 , AIR	AIR	14.9	TBD	17.0	4
FILTER	INLINE	13	14	URL , PPS	H2O	100	.375	TBD	TBD
FILTER	INLINE	14	194	IMFS ,	ALL	300	.5	TBD	TBD
FILTER	INLINE	15	215	IMFS ,	H2O	30	TBD	TBD	TBD
FILTER	INLINE	16	141	IM3 , .05	CN2	4000	TBD	TBD	TBD
FILTER	INLINE	16	133	IM3 , .55	CN2	4000	TBD	TBD	TBD
FILTER	INLINE	16	124	IM3 , .85	CN2	4000	TBD	TBD	TBD
FILTER	INLINE	17	39	URL , PMH	ALL	TBD	TBD	TBD	TBD
FILTER	MULTIPLE	18	73	URL , PMH	H2O	100	.375	TBD	TBD

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TABLE 2.2-4 FLUID SYSTEM HARDWARE - MISCELLANEOUS

COMPONENT TYPE	SUB-TYPE	SHFT/ITEM NO.	PROGRAM APPLICATION	USAGE (MEDIA)	PRESSURE HEAD (PSIA)	PORT SIZE (IN)	APPROX. MASS (LB)	QUANTITY REQUIRED	VENDOR	VENOR PART NUMBER
MISC	BATINE STORAGE	19	116	BC1SS ,NN	URINE, BLINE	TBD	33.0	6	TBD	TBD
MISC	BURST DISK	20	160	SFTN ,	SFTN	VACUUM	1.0	0.9	TBD	TBD
MISC	CABIN COOLING PKG	21	91	BC1SS ,THE	AIR	14.9	TBD	123.0	7	TBD
MISC	CATALYTIC OXIDIZER	22	99	BC1SS ,AN	AIR	30	TBD	60.0	4	TBD
MISC	CO2 REDUCTION, BOSCH	23	94	BC1SS ,AN	AIR	30	.25	328.0	4	TBD
MISC	COMPRESSOR	24	207	INFS ,	REDUCERS	300	.25	30.0	2	TBD
MISC	COMPRESSOR	25	206	INFS ,	ORIDIERS	300	.5	30.0	2	TBD
MISC	COMPRESSOR, REFRIGERANT	26	67	USL ,PMH	GHE	300	.75	141.1	1	TBD
MISC	CONTROL, M2 RESUPPLY BN	27	115	BC1SS ,ACS	GH2	TBD	57.0	1	TBD	TBD
MISC	CONTROLLER, PYRO	28	101	BC1SS ,TDB	HALON 1301	500	N/A	2.0	7	TBD
MISC	CRYO UNIT, L42 PRODUCT	29	59	USL ,PMH	L42	300	.25	33.0	1	TBD
MISC	DIFFUSER, SUCTION	30	40	USL ,PMH	ALL	300	1.0	0.4	14	TBD
MISC	DISPENSER, POTABLE WATER	31	103	BC1SS ,NNW	H2O	44.9	TBD	41.0	2	TBD
MISC	ELECTROLYSIS UNIT, HIGH	32	97	BC1SS ,AN	H2O, 002, GH2	200	TBD	232.0	4	TBD
MISC	EYEWASH	33	109	BC1SS ,NNW	H2O	44.9	TBD	1.0	1	TBD
MISC	FECAL STORAGE	34	117	BC1SS ,NN	FECE	TBD	52.0	1	TBD	TBD
MISC	FLEX HOSE	35	35	USL ,PTS	GHE, AN	50	.25	0.2	40	TBD
MISC	FLEX HOSE	36	7	USL ,PTS	H2O	50	.375	0.4	1	TBD
MISC	FLEX HOSE	37	12	USL ,PTS	H2O	100	.375	1.1	1	TBD
MISC	FLEX HOSE	38	72	USL ,PMH	L1E	300	.75	0.6	4	TBD
MISC	FLEX HOSE	39	151	SFTN ,	VACUUM	1.0	0.0	2	TBD	TBD
MISC	FLEX HOSE, TEFION LINED	40	84	USL ,PMH	ALL	14.7	1.0	0.3	30	TBD
MISC	FLEX HOSE, TEFION LINED	41	78	USL ,PMH	ALL	14.7	1.0	0.5	28	TBD
MISC	FLEX HOSE, TEFION LINED	42	50	USL ,PMH	ALL	14.7	1.0	0.8	7	TBD
MISC	FLEX HOSE, TEFION LINED	43	69	USL ,PMH	ALL	100	2.0	1.9	12	TBD
MISC	HEAT EXCHANGER	44	149	SFTN ,	SFTN	VACUUM	multiple	3.0	1	TBD
MISC	HEATER	45	216	IWS ,	H2O	N/A	0.5	305	TBD	TBD
MISC	MOLECULAR SIEVE, 4-BED	46	96	BC1SS ,AN	AN, CO2	30	TBD	322.0	4	TBD

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TABLE 2.2-4 FLUID SYSTEM HARDWARE - MISCELLANEOUS (CONTINUED)

COMPONENT TYPE	SUB-TYPE	ITEM NO.	PROGRAM APPLICATION	USAGE (MEDIA)	PRESSURE HEAD (PSIA)	PORT SIZE (IN)	APPROX. MASS (LB) REQUIRED	QUANTITY	VENDOR PART NUMBER
MISC	MONITOR, ATMOSPHERE	47	98	BC1SS , AR	AIR	14.9	TBD	5	TBD
MISC	MONITOR, WATER QUALITY	48	106	BC1SS , MM4	H2O	44.9	TBD	60.0	TBD
MISC	POROUS PLUG	49	167	SPHT ,	SFHE	VACUUM	.375	0.3	TBD
MISC	POROUS PLUG	50	168	SPHT ,	SFHE	VACUUM	1.0	1.2	TBD
MISC	PRESSURE CONTROL SYSTEM	51	89	BC1SS , AC3	CO2, GN2	250	.375	50.0	TBD
MISC	PURIFICATION UNIT, MAST	52	77	USL , PHM	ALL	100	2.0	10.0	TBD
MISC	PROCESSING UNIT, PORTAL	53	108	BC1SS , MM4	H2O	44.9	TBD	77.0	TBD
MISC	PROCESSING UNIT, MAST	54	107	BC1SS , MM4	H2O	44.9	TBD	202.0	TBD
MISC	PUMP, FPB	55	23	USL , PFS	H2O	100	.375	11.4	TBD
MISC	PUMP	56	70	USL , PHM	ALL	14.7/100	2.0	22.9	TBD
MISC	PUMP	57	208	TRTS ,	H2O	TBD	35.0	2	TBD
MISC	PUMP, FPB	58	164	SPHT ,	SFHE	VACUUM	1.0	0.8	TBD
MISC	PUMP, VACUUM	59	165	SPHT ,	SFHE	VACUUM	.375	6.0	TBD
MISC	PUMP, VACUUM	60	57	USL , PHM	ALL	.25 TORN/14.7	2.0	55.1	TBD
MISC	PUMP, VACUUM GAGE TON	61	166	SPHT ,	SFHE	VACUUM	.5	3.0	TBD
MISC	REFRIGERATOR/FREEZER	62	113	BC1SS , AC3	TBD	TBD	585.0	3	TBD
MISC	SEPARATOR, GAS/LIQUID	63	45	USL , PHM	ALL	TBD	TBD	12.0	TBD
MISC	SORBENT BED	64	93	BC1SS , AR	AIR	30	TBD	90.0	TBD
MISC	TIRES UNIT	65	61	USL , PHM	H2O	100	.375	95.0	1 HAMILTON STANDARD
MISC	VACUUM UNIT, PORTABLE	66	81	USL , PHM	ALL	TBD	TBD	10.0	TBD
MISC	VENT ASSY, NON-PROPSI	67	162	SPHT ,	SFHE	VACUUM	.375	0.3	TBD
MISC	VENT ASSY, NON-PROPSI	68	161	SPHT ,	SFHE	VACUUM	1.0	0.3	TBD
MISC	VENT ASSY, NON-PROPSI	69	163	SPHT ,	SFHE	VACUUM	MULTIPLE	0.5	TBD
MISC	VENT ASSY, NON-PROPSI	70	132	INS , S3	GN2	4000	TBD	6	TBD
MISC	VENT ASSY, NON-PROPSI	70	123	INS , R3	GN2	4000	TBD	12	TBD
MISC	WATER PROCESSOR	71	16	USL , PFS	H2O	100	.375	66.2	TBD

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TABLE 2.2-5 FLUID SYSTEM HARDWARE - PRESSURE VESSELS

COMPONENT TYPE	SUB-TYPE	ITEM NO.	PROGRAM APPLICATION	USAGE (MEDIA)	PRESSURE HOOP (PSIA)	PORT SIZE (IN)	APPROX. MASS (LB)	QUANTITY REQUIRED	VENDOR	VENDOR PART NUMBER
PRESSURE VESSEL		72	203	INF'S ,	H2O	.30	.25	42.0	1	TBD
PRESSURE VESSEL		73	202	INF'S ,	REDUCERS	.300	.25	101.0	4	TBD
PRESSURE VESSEL		74	27	USL , PFS	GHE	3000	.25	26.0	6	TBD
PRESSURE VESSEL		75	26	USL , PFS	AN	3000	.25	36.4	6	TBD
PRESSURE VESSEL		76	19	USL , PFS	H2O	100	.375	33.1	1	TBD
PRESSURE VESSEL		77	65	USL , PHS	BRINE	TBD	.375	7.5	1	TBD
PRESSURE VESSEL		78	201	INF'S ,	OXIDIZERS	300	.5	101.0	2	TBD
PRESSURE VESSEL		79	51	USL , PHS	ALL	TBD	2.0	14.0	7	TBD
PRESSURE VESSEL		80	218	INF'S ,	H2O	.30	TBD	76.0	0	TBD
PRESSURE VESSEL		81	118	INF'S , RS	GK2	4000	TBD	TBD	12	TBD
PRESSURE VESSEL		82	126	INF'S , SS	GK2	4000	TBD	TBD	6	TBD
PRESSURE VESSEL		83	114	ECLESS , AC3	LH2	TBD	TBD	170.0	2	TBD
PRESSURE VESSEL	ACCUMULATORS	84	205	INF'S ,	H2O	TBD	.25	3.2	1	TBD
PRESSURE VESSEL	ACCUMULATORS	85	56	INF'S ,	OXIDIZERS	35	.25/.5	8.3	2	TBD
PRESSURE VESSEL	ACCUMULATORS	85	204	INF'S ,	REDUCERS	35	.25/.5	8.3	2	TBD
PRESSURE VESSEL	CONDENSATE MATER	86	105	ECLESS , MNH	H2O	44.0	TBD	108.0	2	TBD
PRESSURE VESSEL	EMERGENCY WASH WATER	87	104	ECLESS , MNH	H2O	44.0	TBD	120.0	2	TBD
PRESSURE VESSEL	FIRE SUPPRESSANT	88	100	ECLESS , FDS	HALON 1301	500	TBD	8.0	76	TBD
PRESSURE VESSEL	IGCIDE WATER	89	112	ECLESS , MNH	H2O	44.0	TBD	600.0	1	TBD
PRESSURE VESSEL	ISOCRIO	90	147	SEHT ,	SPIRE	multiple	150.0	1	TBD	TBD
PRESSURE VESSEL	LIQUID MATE	91	44	USL , PHS	ALL	TBD	.25	5.0	7	TBD
PRESSURE VESSEL	MATERIAL TRANS. CONT.	92	75	USL , PHS	ALL	TBD	TBD	9.9	1	TBD
PRESSURE VESSEL	PORTABLE	93	29	USL , PFS	ALL BUT H2O	2000	.25	12.5	19	TBD
PRESSURE VESSEL	PORTABLE WATER	94	102	ECLESS , MNH	H2O	44.0	TBD	166.0	4	TBD
PRESSURE VESSEL	PROCESS WATER	95	15	USL , PFS	H2O	100	.375	080.3	1	TBD
PRESSURE VESSEL	PROCESSED HYGIENE WATER	96	110	ECLESS , MNH	H2O	44.0	TBD	315.0	2	TBD
PRESSURE VESSEL	STIFFENED MONOCOQUE	97	148	SEHT ,	SPIRE	multiple	500.0	1	TBD	TBD
PRESSURE VESSEL	STORAGE CONT.	98	21	USL , PFS	H2O	50	.375	15.4	1	TBD
PRESSURE VESSEL	WASTE CONTAINMENT	99	42	USL , PHS	ALL	TBD	.25	18.0	7	TBD
PRESSURE VESSEL	WASTE GAS	100	55	USL , PHS	ALL	TBD	2.0	703.4	2	TBD

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TABLE 2.2-5 FLUID SYSTEM HARDWARE - PRESSURE VESSELS (CONTINUED)

COMPONENT TYPE	SUB-TYPE	SHKT ITEM NO.	PROGRAM APPLICATION	USAGE (MEDIA)	PRESSURE HEAD (PSIA)	PORT SIZE (IN)	APPROX. MASS (LB)	QUANTITY REQUIRED	VENDOR	VENDOR PART NUMBER
PRESSURE VESSEL	WASTE HOLDING	101 68	USL .PMH	ALL	TBD	2.0	15.0	1	TBD	TBD
PRESSURE VESSEL	WASTE HYDROGEN WATER	102 111	HCLSS .MMH	H2O	44.9	TBD	292.5	2	TBD	TBD

TABLE 2.2-6 FLUID SYSTEM HARDWARE - REGULATORS

COMPONENT TYPE	SUB-TYPE	SHKT ITEM NO.	PROGRAM APPLICATION	USAGE (MEDIA)	PRESSURE HEAD (PSIA)	PORT SIZE (IN)	APPROX. MASS (LB)	QUANTITY REQUIRED	VENDOR	VENDOR PART NUMBER
REGULATOR	DOWNTSTREAM	103 169	TMS	REDUCERS	3000/15	.25	0.3	2	EATON CONSOLIDATED CONTROLS CORP.	13890 MODIFIED
REGULATOR	DOWNTSTREAM	103 186	TMS	REDUCERS	1000/75	.25	0.3	2	EATON CONSOLIDATED CONTROLS CORP.	13890 MODIFIED
REGULATOR	DOWNTSTREAM	104 191	TMS	REDUCERS	750/30	.25	0.5	6	AERODYNE CONTROLS CORP.	30464-5-000 MODIFIED
REGULATOR	DOWNTSTREAM	104 212	TMS	REDUCERS	750/30	.25	0.5	4	AERODYNE CONTROLS CORP.	30464-5-000 MODIFIED
REGULATOR	DOWNTSTREAM	105 24	USL .PTG	GAS, AIR	3000/50	.25	1.0	2	FUTUREFAULT CORP.	400236 MODIFIED
REGULATOR	DOWNTSTREAM	106 67	HCLSS .HCH	GAS	750/30	.375	1.0	2	TBD	TBD
REGULATOR	DOWNTSTREAM	107 43	USL .PMH	ALL	3000/15	1.0	2.0	14	TBD	TBD
REGULATOR	ELECTRONIC, W/RELIEF	108 143	TMS .DS	GAS	4000/750	.375	4.0	2	TBD	TBD

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TABLE 2.2-7 FLUID SYSTEM HARDWARE - SENSORS

COMPONENT TYPE	SUB-TYPE	ITEM NO.	PROGRAM APPLICATION	US/G-E (MEDIA)	PRESSURE HEAD (PSIA)	PORT SIZE (IN)	APPROX. MASS (LB)	QUANTITY REQUIRED	VENDOR	VENDOR PART NUMBER
SENSOR	DELTA PRESSURE	123	22 USL , PFS	H2O	100	.375	0.5	1	TBD	TBD
SENSOR	FLOW METER	109	13 USL , PFS	H2O	100	.375	2.0	2	TBD	TBD
SENSOR	FLOW METER	110	41 USL , PFS	ALL	14.7	TBD	0.8	14	TBD	TBD
SENSOR	FLOW METER, GAS	111	174 SFNT ,	SFNE	VACUUM	.375	1.0	1	TBD	TBD
SENSOR	FLOW METER, LIQUID	112	173 SFNT ,	SFNE	VACUUM	1.0	1.0	2	TBD	TBD
SENSOR	FLOW METER	113	172 SFNT ,	SFNE	VACUUM	TBD	0.1	1	TBD	TBD
SENSOR	PRESSURE	114	170 SFNT ,	SFNE	VACUUM	.25	0.8	5	TBD	TBD
SENSOR	PRESSURE	115	1 USL , VVM	ALL	.25 (TYPICAL)	.25	1.9	2	TBD	MEC-1100-10
SENSOR	PRESSURE	116	47 USL , PFS	ALL	14.7	.25	0.4	65	KULITE SEMICONDUCTOR PRODUCTS INC.	2131-0001-5
SENSOR	PRESSURE	117	213 TNS ,	H2O	30	.25	0.5	28	MOOG, CARLETON GROUP	2131-0001-5
SENSOR	PRESSURE	117	193 TNS ,	H2O	30	.25	0.5	14	MOOG, CARLETON GROUP	2131-0001-5
SENSOR	PRESSURE	118	192 TNS ,	NE/GM/INERTS	300	.25	0.5	42	TELDRIVE TABER	2103-200
SENSOR	PRESSURE	119	145 TNS , DS	GN2	750	.25	0.4	2	IMD DELVAL INC., CEC INSTA. DIV.	615505 MODIFIED
SENSOR	PRESSURE	120	10 USL , PFS	GHE, AR	3000	.25	0.5	2	STATHAM DIVISION, SOLARTRON	CR9204/A MODIFIED
SENSOR	PRESSURE	121	126 TNS , RS	GN2	4000	.25	0.6	16	EATON CONSOLIDATED CONTROLS CORP.	41SG191-2000AL MOD.
SENSOR	PRESSURE	121	135 TNS , SS	GN2	4000	.25	0.6	10	EATON CONSOLIDATED CONTROLS CORP.	41SG191-2000AL MOD.
SENSOR	PRESSURE	121	144 TNS , DS	GN2	4000	.25	0.6	2	EATON CONSOLIDATED CONTROLS CORP.	41SG191-2000AL MOD.
SENSOR	PRESSURE	122	66 USL , PFS	ALL	TBD	.25	0.7	7	TBD	TBD
SENSOR	QUALITY METER	124	25 USL , PFS	H2O	100	.375	2.2	1	TBD	TBD
SENSOR	QUALITY MONITOR	125	60 USL , PFS	H2O	TBD	22.1	2	TBD	TBD	TBD
SENSOR	TEMPERATURE	126	171 SFNT ,	SFNE	VACUUM	.25	0.2	15	TBD	TBD
SENSOR	TEMPERATURE	127	214 TNS ,	H2O	30	.25	0.1	28	TBD	TBD
SENSOR	TEMPERATURE	128	146 TNS , DS	GN2	750	.25	0.1	2	TBD	TBD
SENSOR	TEMPERATURE	129	6 USL , PFS	GHE, AR	3000	.25	0.2	2	TBD	TBD
SENSOR	TEMPERATURE	130	136 TNS , SS	GN2	4000	.25	0.2	6	TBD	TBD
SENSOR	TEMPERATURE	130	127 TNS , RS	GN2	4000	.25	0.2	12	TBD	TBD
SENSOR	TEMPERATURE	131	49 USL , PFS	ALL	TBD	.25	0.1	14	TBD	TBD
SENSOR	TEMPERATURE	132	62 USL , PFS	H2O	TBD	.25	0.1	1	TBD	TBD

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TABLE 2.2-8 FLUID SYSTEM HARDWARE - VALVES

COMPONENT TYPE	SUB-TYPE	ITEM NO.	PROGRAM APPLICATION	USAGE (MEDIA)	PRESSURE MEAS (PSIA)	PORT SIZE (IN)	APPROX. MASS (LB)	QUANTITY REQUIRED	VENDOR	VENDOR PART NUMBER
VALVE	CHECK	133	180	INF'S	H2O	.30	.25	.5	0	WACO INDUSTRIES
VALVE	CHECK	133	211	TMS	H2O	.30	.25	.5	6	WACO INDUSTRIES
VALVE	CHECK	134	187	INF'S	REDUCERS	.300	.25	.5	14	WACO INDUSTRIES
VALVE	CHECK	135	10	USL .PFS	GHE, AR	.3000	.25	.7	1	CIRCLE SEAL CONTROLS
VALVE	CHECK	136	36	USL .PMH	ALL	TBD	.25	.6	TBD	CR77A-40
VALVE	CHECK	137	17	USL .PFS	H2O	.100	.375	.9	2	TBD
VALVE	CHECK	138	71	USL .PMH	ALL	TBD	.375	.9	3	TBD
VALVE	CHECK	139	186	INF'S	REDUCERS	.300	.5	.2	12	MANTTA SCIENTIFIC CONTROLS
VALVE	ELECTRIC	140	176	INF'S	REDUCERS	.150	.25	1.5	40	WRIGHT COMPONENTS INC.
VALVE	ELECTRIC	141	180	INF'S	H2O	.30	.25	1.4	24	WRIGHT COMPONENTS INC.
VALVE	ELECTRIC	142	178	INF'S	GN2	.30	.25	.5	6	WRIGHT COMPONENTS INC.
VALVE	ELECTRIC	142	34	USL .PFS	GHE, AR	.50	.25	.5	36	WRIGHT COMPONENTS INC.
VALVE	ELECTRIC	143	177	INF'S	REDUCERS	.180	.25	.5	2	MOOG, SPACE PRODUCTS DIVISION
VALVE	ELECTRIC	144	179	INF'S	GN2	.800	.25	1.5	2	TBD
VALVE	ELECTRIC	145	9	USL .PFS	GHE, AR	.3000	.25	1.5	12	AMETEK, STRATA DIVISION
VALVE	ELECTRIC	146	175	INF'S	REDUCERS	.15	.375	.6	34	WRIGHT COMPONENTS INC.
VALVE	ELECTRIC	147	32	USL .PFS	H2O	.170	.375	1.7	1	HOOG, SPACE PRODUCTS DIVISION
VALVE	ELECTRIC	148	181	INF'S	ALL	.15	.5	1.5	6	WRIGHT COMPONENTS INC.
VALVE	ELECTRIC	149	30	USL .PMH	ALL	.3000	1.0	2.2	50	AMETEK, STRATA DIVISION
VALVE	ELECTRIC	150	4	USL .VVS	ALL	.25 (TOMA)	6.0	15.0	4	TBD
VALVE	ELECTRIC	151	209	TMS	H2O	.30	TBD	3.0	80	TBD
VALVE	ELECTRIC	152	63	USL .PMH	ALL	TBD	TBD	1.7	2	TBD
VALVE	EQUALIZATION	153	90	KCLSL .ACS	AIR	.14.9	TBD	6.0	9	TBD
VALVE	FLOW RESTRICTOR	154	20	USL .PFS	H2O	.100	.375	.3	1	TBD
VALVE	FLOW RESTRICTOR	155	0	USL .PFS	GHE, AR	.3000	.375	.2	2	TBD
VALVE	HANDAL, SERVICE	156	119	TMS .RS	GN2	.4000	.5	2.0	2	WACO INDUSTRIES
VALVE	HANDAL, SHUT-OFF	157	155	SEFT	SEFT	VACUUM	1.0	1.0	1	TBD
VALVE	HANDAL, SHUT-OFF	158	2	USL .VVS	ALL	.25 (TOMA)	2.0	1.4	22	TBD
VALVE	HANDAL, SHUT-OFF	159	5	USL .VVS	ALL	.25 (TOMA)	6.0	0.7	2	TBD
VALVE	RELIEF	160	88	KCLSL .ACS	AIR	.16.9	.25	1.0	5	TBD
VALVE	RELIEF	161	185	INF'S	H2O	.30	.25	1.0	1	TBD
VALVE	RELIEF	161	210	TMS	H2O	.30	.25	1.0	0	TBD
VALVE	RELIEF	162	103	INF'S	REDUCERS	.300	.25	2.0	0	TBD
VALVE	RELIEF	163	52	USL .PMH	ALL	TBD	.25	1.5	5	TBD
VALVE	RELIEF	164	182	INF'S	REDUCERS	.300	.5	2.0	2	TBD

TABLE 2.2-8 FLUID SYSTEM HARDWARE - VALVES (CONTINUED)

COMPONENT TYPE	SUB-TYPE	SHEET ITEM NO.	PROGRAM APPLICATION	USAGE (MEDIA)	PRESSURE RAMP (PSIA)	PORT SIZE (IN)	APPROX. MASS (LB)	QUANTITY REQUIRED	VENDOR	VENDOR PART NUMBER
VALVE	RELIEF	165	156 SFHT	VACUUM	1.0	.3.0	2	TBD	TBD	
VALVE	RELIEF	166	159 SFHT	VACUUM	1.0	.2.0	1	TBD	TBD	
VALVE	RELIEF	167	53 USL ,PMH	ALL	TBD	.3.9	2	TBD	TBD	
VALVE	RELIEF W/BD	168	122 INS ,RS	GN2	4000	.25	TBD	12	TBD	
VALVE	RELIEF W/BD	169	131 INS ,SS	GN2	4000	.25	TBD	6	TBD	
VALVE	SEAL-OFF, VACUUM	169	157 SFHT	VACUUM	0.5	.0.5	4	TBD	TBD	
VALVE	SEAL-OFF, VACUUM	170	156 SFHT	VACUUM	1.0	.1.0	1	TBD	TBD	
VALVE	SOLENOID, LATCHING	171	154 SFHT	VACUUM	1.0	.3.0	4	TBD	TBD	
VALVE	SOLENOID, LATCHING	172	129 INS ,SS	GN2	4000	.25	.1.6	12	TBD	
VALVE	SOLENOID, LATCHING	172	139 INS ,DS	GN1	4000	.25	.1.6	3	TBD	
VALVE	SOLENOID, LATCHING	172	120 INS ,BS	GN2	4000	.25	.1.6	24	TBD	
VALVE	SOLENOID, LATCHING	173	140 INS ,DS	GN2	750	TBD	TBD	3	TBD	
VALVE	SOLENOID, LATCHING W/BP	174	152 SFHT	VACUUM	.375	.1.5	6	TBD	TBD	
VALVE	SOLENOID, LATCHING W/BP	175	153 SFHT	VACUUM	1.0	4.0	22	TBD	TBD	
VALVE	TOQUE MOTOR	176	130 INS ,SS	GN2	4000	.25	.4.6	6	TBD	
VALVE	TOQUE MOTOR	176	121 INS ,RS	GN2	4000	.25	.1.6	4	TBD	
VALVE	TOQUE MOTOR	176	137 INS ,DS	GN2	4000	.25	.1.6	4	TBD	
VALVE	TOQUE MOTOR	177	138 INS ,DS	GN2	750	.25	.1.6	12	TBD	
VALVE	VENT ASSY	178	74 USL ,PMH	ALL	TBD	2.0	.3.9	2	TBD	

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2.3 FLUID SYSTEM HARDWARE LISTING BY FLUID/MEDIA TYPE

Tables 2.3-1 through 2.3-23 list the components by the fluid or media usage.

TABLE 2.3-1 FLUID SYSTEM HARDWARE - AIR

USAGE (MEDIA)	SHEET NUMBER	ITEM NO.	PROGRAM APPLICATION	COMPONENT TYPE	SUB-TYPE	PRESSURE RELIEF (psi)	PORT SIZE (in)	APPROX. WEIGHT (lb)	QUANTITY REQUIRED	VENOR PART NUMBER
AIR	11	92	ICLAS, AR	FILTER	AVIATION PARTICULATE	14.5	TBD	17.0	4	TBD
AIR	12	95	ICLAS, AR	FILTER	IMACTERA/PARTICULATE	14.5	TBD	60.0	7	TBD
AIR	21	91	ICLAS, TMC	MESC	CABIN COOLING PIG	14.5	TBD	123.0	7	TBD
AIR	22	99	ICLAS, AR	MESC	CATALYTIC OXIDIZER	30	TBD	66.0	4	TBD
AIR	23	94	ICLAS, AR	MESC	CO ₂ ADDITION, BOSCH	30	.25	320.0	4	TBD
AIR	47	90	ICLAS, AR	MESC	MONITOR, ATMOSPHERE	14.5	TBD	57.0	5	TBD
AIR	64	93	ICLAS, AR	MESC	ISOBENT BED	30	TBD	90.0	4	TBD
AIR	133	90	ICLAS, AC3	VALVE	EQUALIZATION	14.5	TBD	6.0	9	TBD
AIR	160	88	ICLAS, AC3	VALVE	RELIEF	14.5	.25	1.0	5	TBD
										TBD

TABLE 2.3-2 FLUID SYSTEM HARDWARE - AIR AND CO₂

USAGE (MEDIA)	SHEET NUMBER	ITEM NO.	PROGRAM APPLICATION	COMPONENT TYPE	SUB-TYPE	PRESSURE RELIEF (psi)	PORT SIZE (in)	APPROX. WEIGHT (lb)	QUANTITY REQUIRED	VENOR PART NUMBER
AIR, CO ₂	46	96	ICLAS, AR	MESC	MOLECULAR SIEVE, 4-AED	30	TBD	322.0	4	TBD

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TABLE 2.3-3 FLUID SYSTEM HARDWARE - ALL

USAGE (MEDIA)	SHEET NUMBER	ITEM NO.	PROGRAM APPLICATION	COMPONENT TYPE	SUB-TYPE	PRESSURE RANGE (psi)	PORT SIZE (in)	APPROX. WEIGHT (lb)	QUANTITY REQUIRED	VENDOR	VENDOR PART NUMBER
ALL	1	48	1 USL, PHH	DISCONNECT		14.7	.25	0.8	7	SYMETRICS INC.	
ALL	5	50	1 USL, PHH	DISCONNECT		14.7	.375	0.4	17	SYMETRICS INC.	
ALL	4	37	1 USL, PHH	DISCONNECT		14.7	1.0	1.0	101	TBD	
ALL	6	64	1 USL, PHH	DISCONNECT		14.7	2.0	1.8	10	TBD	
ALL	6	3	1 USL, VVS	DISCONNECT		.25 (TORN)	2.0	1.8	22	TBD	
ALL	14	184	1 INF.	FILTER	INLINE	100	.5	0.5	4	TBD	
ALL	17	39	1 USL, PHH	FILTER	INLINE	TBD	1.0	1.3	TBD	TBD	
ALL	30	40	1 USL, PHH	VISC	DIFFUSER, SUCTION	300	1.0	0.4	14	TBD	
ALL	40	84	1 USL, PHH	VISC	FLUX HOSE, TEFLON LINED	14.7	1.0	0.3	30	TBD	
ALL	41	74	1 USL, PHH	VISC	FLUX HOSE, TEFLON LINED	14.7	1.0	0.5	28	TBD	
ALL	42	50	1 USL, PHH	VISC	FLUX HOSE, TEFLON LINED	14.7	1.0	0.4	7	TBD	
ALL	43	69	1 USL, PHH	VISC	FLUX HOSE, TEFLON LINED	100	2.0	1.9	12	TBD	
ALL	52	77	1 USL, PHH	VISC	PRETREATMENT UNIT, WASTE	100	2.0	10.0	2	TBD	
ALL	56	70	1 USL, PHH	PUMP	PUMP, VACUUM	.25 TORN/14.7	2.0	22.9	2	TBD	
ALL	60	51	1 USL, PHH	PUMP	SEPARATOR, GAS/LIQUID	TBD	TBD	550.3	3	TBD	
ALL	63	45	1 USL, PHH	PUMP	VACUUM UNIT, VARIABLE	TBD	TBD	12.0	7	TBD	
ALL	66	81	1 USL, PHH	PUMP	PRESSURE VESSEL	TBD	TBD	10.0	1	TBD	
ALL	79	51	1 USL, PHH	PUMP	PRESSURE VESSEL	TBD	TBD	14.0	7	TBD	
ALL	91	44	1 USL, PHH	PUMP	PRESSURE VESSEL	TBD	TBD	5.0	7	TBD	
ALL	92	75	1 USL, PHH	PUMP	PRESSURE VESSEL	TBD	TBD	9.9	1	TBD	
ALL	99	42	1 USL, PHH	PUMP	PRESSURE VESSEL	TBD	TBD	10.0	7	TBD	
ALL	100	55	1 USL, PHH	PUMP	HASTE GAS	TBD	2.0	703.4	2	TBD	
ALL	101	60	1 USL, PHH	PUMP	HASTE HOLDING	TBD	2.0	15.0	1	TBD	
ALL	107	43	1 USL, PHH	REGULATOR	DOWNTREAM	3000/15	1.0	2.0	14	TBD	
ALL	110	41	1 USL, PHH	SENSOR	FLOW METER	14.7	TBD	0.8	14	TBD	
ALL	115	1	1 USL, VVS	SENSOR	PRESSURE	.25 (TORN)	.25	1.9	2	TBD	
ALL	116	47	1 USL, PHH	SENSOR	PRESSURE	14.7	.25	0.4	65	MULITE SEMICONDUCTOR PRODUCTS INC.	BMOE-1100-10
ALL	122	66	1 USL, PHH	SENSOR	PRESSURE	TBD	.25	0.7	7	TBD	
ALL	131	49	1 USL, PHH	SENSOR	TEMPERATURE	TBD	.25	0.1	14	TBD	
ALL	136	26	1 USL, PHH	VALVE	CHECK	TBD	.25	0.6	0	TBD	
ALL	138	71	1 USL, PHH	VALVE	CHECK	TBD	.375	0.9	3	TBD	
ALL	140	101	1 INF.	VALVE	ELECTRIC	TBD	.15	1.5	0	MRGHT COMPONENTS INC.	15975
ALL	149	38	1 USL, PHH	VALVE	ELECTRIC	3000	1.0	2.2	50	AMETEK, STRAUA DIVISION	535-503
ALL	150	4	1 USL, VVS	VALVE	ELECTRIC	.25 (TORN)	6.0	15.0	4	TBD	
ALL	152	63	1 USL, PHH	VALVE	ELECTRIC	TBD	1.7	2	TBD	TBD	
ALL	158	2	1 USL, VVS	VALVE	HANIFAN, SHUT-OFF	.25 (TORN)	2.0	1.4	22	TBD	

TABLE 2.3-3 FLUID SYSTEM HARDWARE - ALL (CONTINUED)

USAGE (MEDIA)	ITEM NUMBER	PROGRAM APPLICATION	COMPONENT TYPE	SUB-TYPE	PRESSURE RAMP (psi)	PORT SIZE (in)	APPROX. WEIGHT (lb)	QUANTITY REQUIRED	VENDOR	VENDOR PART NUMBER
ALL	139	5 UBL-PFS	VALVE	HANDBL. SHUT-OFF	.25 (TOAR)	6.0	0.7	2	TBD	TBD
ALL	163	52 UBL-PFS	VALVE	RELIEF	TBD	.25	1.5	5	TBD	TBD
ALL	167	53 UBL-PFS	VALVE	RELIEF	TBD	TBD	3.0	2	TBD	TBD
ALL	178	74 UBL-PFS	VALVE	VENT ASY	TBD	.25	3.0	2	TBD	TBD

ALL INCLUDES GHe, Ar, H₂O, FREON AND CO₂TABLE 2.3-4 FLUID SYSTEM HARDWARE - ALL BUT H₂O

USAGE (MEDIA)	ITEM NUMBER	PROGRAM APPLICATION	COMPONENT TYPE	SUB-TYPE	PRESSURE RAMP (psi)	PORT SIZE (in)	APPROX. WEIGHT (lb)	QUANTITY REQUIRED	VENDOR	VENDOR PART NUMBER
ALL BUT H ₂ O	93	28 UBL-PFS	PRESSURE VESSEL	PORTABLE	2000	.25	12.5	10	TBD	TBD

TABLE 2.3-5 FLUID SYSTEM HARDWARE - Ar

USAGE (MEDIA)	ITEM NUMBER	PROGRAM APPLICATION	COMPONENT TYPE	SUB-TYPE	PRESSURE RAMP (psi)	PORT SIZE (in)	APPROX. WEIGHT (lb)	QUANTITY REQUIRED	VENDOR	VENDOR PART NUMBER
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TABLE 2.3-6 FLUID SYSTEM HARDWARE - BRINE

USAGE (MEDIA)	SHEET NUMBER	ITEM NO.	PROGRAM APPLICATION	COMPONENT TYPE	SUB-TYPE	PRESSURE RELP (psi)	PORT SIZE (in)	APPROX. MASS (lb)	QUANTITY REQUIRED	VENDOR	VENUE PART NUMBER
BRINE	77	65	USB, PHM	PRESSURE VESSEL		TBD	.375	7.5	1	TBD	TBD

TABLE 2.3-7 FLUID SYSTEM HARDWARE - FECES

USAGE (MEDIA)	SHEET NUMBER	ITEM NO.	PROGRAM APPLICATION	COMPONENT TYPE	SUB-TYPE	PRESSURE RELP (psi)	PORT SIZE (in)	APPROX. MASS (lb)	QUANTITY REQUIRED	VENDOR	VENUE PART NUMBER
FECES	34	117	REC48, NM	MFC	FECAL STORAGE	TBD	TBD	52.0	1	TBD	TBD

TABLE 2.3-8 FLUID SYSTEM HARDWARE - GH2

USAGE (MEDIA)	SHEET NUMBER	ITEM NO.	PROGRAM APPLICATION	COMPONENT TYPE	SUB-TYPE	PRESSURE RELP (psi)	PORT SIZE (in)	APPROX. MASS (lb)	QUANTITY REQUIRED	VENDOR	VENUE PART NUMBER
GH2	184	179	IMPE,	VALVE	ELECTRIC	600	.25	1.5	2	TBD	TBD

TABLE 2.3-9 FLUID SYSTEM HARDWARE - GHe

USAGE (MEDIA)	SHEET NUMBER	ITEM NO.	PROGRAM APPLICATION	COMPONENT TYPE	SUB-TYPE	PRESSURE RELP (psi)	PORT SIZE (in)	APPROX. MASS (lb)	QUANTITY REQUIRED	VENDOR	VENUE PART NUMBER
GH2	74	67	USB, PHM	MFC	COMPRESSION, REFRIGERATION	300	.75	141.1	1	TBD	TBD
GHe	74	27	USB, PFS	PRESSURE VESSEL		3600	.25	26.0	6	TBD	TBD

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TABLE 2.3-10 FLUID SYSTEM HARDWARE - GW2

ITEM NO./NAME		PROGRAM APPLICATION		COMPONENT TYPE	SUB-TYPE	PRESSURE RELP (Psi)	PORT SIZE (in)	APPROX. MASS (lb)	QUANTITY REQUIRED	VENDOR	VENDOR PART NUMBER
GN2	1	200	1INFS,1NS	DISCONNECT			.750	.25	0-8	SYNTERRA INC.	502040-1011 4 - 3012
GN2	0	125	1INS,RS	DISCONNECT		4000	TBD		4	TBD	TBD
GN2	0	142	1INS,DS	DISCONNECT		4000	TBD		4	TBD	TBD
GN2	0	134	1INS,SS	DISCONNECT		4000	TBD		6	TBD	TBD
GN2	16	124	1INS,RS	FILTER	INLINE	4000	TBD		4	TBD	TBD
GN2	16	141	1INFS,DS	FILTER	INLINE	4000	TBD		4	TBD	TBD
GN2	16	133	1INS,SS	FILTER	INLINE	4000	TBD		6	TBD	TBD
GN2	27	115	1ICLSS,ACCS	MISC	CONTROL, M2 RESUPPLY PIES	TBD	TBD	57.0	1	TBD	TBD
GN2	70	123	1INS,RS	MISC	VENT ASSY, NON-PROPULSIVE	4000	TBD		12	TBD	TBD
GN2	70	132	1INS,SS	MISC	VENT ASSY, NON-PROPULSIVE	4000	TBD		6	TBD	TBD
GN2	81	118	1INS,RS	PRESSURE VESSEL		4000	TBD		12	TBD	TBD
GN2	82	126	1INS,SS	PRESSURE VESSEL		4000	TBD		6	TBD	TBD
GN2	104	212	1INS,	REGULATOR	DOWNTREAM	750/30	.25	0-6	4	AERODINE CONTROLS CORP.	3066-5-000 MODIFIED
GN2	104	181	1INFS,	REGULATOR	DOWNTREAM	750/30	.25	0-6	6	AERODINE CONTROLS CORP.	3066-5-000 MODIFIED
GN2	106	87	1ICLSS,ACCS	REGULATOR	DOWNTREAM	750/30	.375	1-0	2	TBD	TBD
GN2	108	143	1INFS,DS	REGULATOR	ELECTRONIC, W/RELIEF	4000/750	.375	4-0	2	TBD	TBD
GN2	119	145	1INS,DS	SENSOR	PRESSURE	710	.25	0-4	2	TRW DEFLAVI TMC - FFC INSTR INV	415G197 - 200001 MOD.
GN2	121	135	1INS,SS	SENSOR	PRESSURE	4000	.25	0-6	10	EATON CONSOLIDATED CONTROLS CORP.	415G197 - 200001 MOD.
GN2	121	144	1INS,DS	SENSOR	PRESSURE	4000	.25	0-6	2	EATON CONSOLIDATED CONTROLS CORP.	415G197 - 200001 MOD.
GN2	121	126	1INS,RS	SENSOR	PRESSURE	4000	.25	0-6	16	EATON CONSOLIDATED CONTROLS CORP.	415G197 - 200001 MOD.
GN2	120	146	1INS,DS	SENSOR	TEMPERATURE	750	.25	0-1	2	TBD	TBD
GN2	130	136	1INS,SS	SENSOR	TEMPERATURE	4000	.25	0-2	6	TBD	TBD
GN2	130	127	1INS,RS	SENSOR	TEMPERATURE	4000	.25	0-2	12	TBD	TBD
GN2	142	170	1INS,	VALVE	ELECTRIC	30	.25	0-5	6	MIGHT COMPONENTS INC.	15611-2
GN2	156	119	1INS,RS	VALVE	HANDL, SERVICE	4000	.5	2-0	2	VACCO INDUSTRIES	VIE10130-01
GN2	168	131	1INS,SS	VALVE	RELIEF M/BD	4000	.25	TBD	6	TBD	TBD
GN2	168	122	1INS,RS	VALVE	RELIEF M/BD	4000	.25	TBD	12	TBD	TBD
GN2	172	139	1INS,DS	VALVE	SOLENOID, LATCHING	4000	.25	1-6	3	TBD	TBD
GN2	172	120	1INS,RS	VALVE	SOLENOID, LATCHING	4000	.25	1-6	24	TBD	TBD
GN2	176	129	1INS,SS	VALVE	SOLENOID, LATCHING	4000	.25	1-6	12	TBD	TBD
GN2	173	140	1INS,DS	VALVE	SOLENOID, LATCHING	750	TBD		3	TBD	TBD
GN2	176	121	1INS,RS	VALVE	TOQUE MOTOR	4000	.25	1-6	4	TBD	TBD
GN2	176	130	1INS,SS	VALVE	TOQUE MOTOR	4000	.25	1-6	8	TBD	TBD
GN2	176	137	1INS,DS	VALVE	TOQUE MOTOR	4000	.25	1-6	4	TBD	TBD
GN2	177	138	1INS,DS	VALVE	TOQUE MOTOR	750	.25	1-6	12	TBD	TBD

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TABLE 2.3-11 FLUID SYSTEM HARDWARE - GHe AND Ar

USAGE (MEDIA)	ITEM NUMBER	PROGRAM APPLICATION	COMPONENT TYPE	SUB-TYPE	PRESSURE RAMP (psi/s)	PORT SIZE (in)	APPROX. WEIGHT (MASS (lb)) REQUIRED	QUANTITY	VENOR	VENDOR PART NUMBER
GHe, Ar	2	11 USBL.PPS	DISCONNECT		3000	.35	0.6	12	PTI TECHNOLOGIES, INC.	7537191-4
GHe, Ar	35	35 USBL.PPS	KSC	FLLEX HOSE	50	.35	0.2	40	TBD	
GHe, Ar	105	24 USBL.PPS	REGULATOR	DOWNSTREAM	3000/50	.35	1.0	2	FUTURECRAFT CORP.	400236 MODIFIED
GHe, Ar	120	18 USBL.PPS	SENSOR	PRESSURE	3000	.25	0.5	2	STATION DIVISION, SOLARION	C59284A MODIFIED
GHe, Ar	129	6 USBL.PPS	SENSOR	TEMPERATURE	3000	.25	0.2	2	TBD	
GHe, Ar	135	10 USBL.PPS	VALVE	CHECK	3000	.25	0.7	1	CALICE SEAL CONTROLS	C571A-0
GHe, Ar	142	34 USBL.PPS	VALVE	ELECTRIC	50	.25	0.5	36	MIGHT COMPONENTS INC.	15611-2
GHe, Ar	145	9 USBL.PPS	VALVE	ELECTRIC	3000	.25	1.5	12	AMETEK, STRATA DIVISION	435
GHe, Ar	155	8 USBL.PPS	VALVE	FLOW RESTRICTOR	3000	.375	0.2	2	TBD	

TABLE 2.3-12 FLUID SYSTEM HARDWARE - GO2 AND GN2

USAGE (MEDIA)	ITEM NUMBER	PROGRAM APPLICATION	COMPONENT TYPE	SUB-TYPE	PRESSURE RAMP (psi/s)	PORT SIZE (in)	APPROX. WEIGHT (MASS (lb)) REQUIRED	QUANTITY	VENOR	VENDOR PART NUMBER
GO2, GN2	51	69 INCLAS.AC3	KSC	PRESSURE CONTROL SYSTEM	250	.375	50.0	5	TBD	

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TABLE 2.3-13 FLUID SYSTEM HARDWARE - H₂O

USAGE (MEDIA)	SHEET NUMBER	ITEM NO.	PROGRAM APPLICATION	COMPONENT TYPE	SUB-TYPE	PRESSURE, PCP (psi)	PORT SIZE (in)	APPROX. WEIGHT (lb)	QUANTITY REQUIRED	VENDOR	VENDOR PART NUMBER
H2O	1	199	1MFS, 1MS	DISCONNECT		30	.25	0.8	16	SYMETRICS INC.	502040-1011 4 -012
H2O	1	30	1USL, PFS	DISCONNECT		100	.25	0.8	44	SYMETRICS INC.	502040-1011 4 -012
H2O	3	33	1USL, PFS	DISCONNECT		100	.375	0.4	36	SYMETRICS INC.	592002-3 4 -4
H2O	7	217	1MS,	DISCONNECT		30	TBD	4	TBD	TBD	TBD
H2O	13	14	1USL, PFS	FILTER	INLINE	100	.375	5.5	1	TBD	TBD
H2O	15	215	1MS,	FILTER	INLINE	30	TBD	1.0	TBD	TBD	TBD
H2O	18	73	1USL, PPH	FILTER	MULTIPLE	100	.375	48.5	1	TBD	TBD
H2O	31	103	1CCLSL, MMW	MEIS	DISPENSER, POTABLE WATER	44.9	TBD	41.0	2	TBD	TBD
H2O	33	109	1CCLSL, MMW	MEIS	EYEWASH	44.9	TBD	1.0	1	TBD	TBD
H2O	36	7	1USL, PFS	MEIS	FLUX NOSE	50	.375	0.4	1	TBD	TBD
H2O	37	12	1USL, PFS	MEIS	FLUX NOSE	100	.375	1.1	1	TBD	TBD
H2O	45	216	1MS,	HEATER	N/A	N/A	0.5	305	TBD	TBD	TBD
H2O	48	106	1CCLSL, MMW	MEIS	MONITOR, WATER QUALITY	44.9	TBD	68.0	0	TBD	TBD
H2O	53	108	1CCLSL, MMW	MEIS	PROCESSING UNIT, POTABLE	44.9	TBD	77.0	4	TBD	TBD
H2O	54	107	1CCLSL, MMW	MEIS	PROCESSING UNIT, WASTE, NY	44.9	TBD	202.0	2	TBD	TBD
H2O	55	23	1USL, PFS	MEIS	PUMP	100	.375	11.4	1	TBD	TBD
H2O	57	278	1MS,	MEIS	PUMP	TBD	25.0	4	TBD	TBD	TBD
H2O	65	61	1USL, PPH	MEIS	TISSUE UNIT	100	.375	95.0	1	HAMILTON STANDARD	TBD
H2O	71	16	1USL, PFS	MEIS	WATER PROCESSOR	100	.375	66.2	1	TBD	TBD
H2O	72	203	1MS,	PRESSURE VESSEL	PRESSURE VESSEL	30	.25	42.0	1	TBD	TBD
H2O	76	19	1USL, PFS	PRESSURE VESSEL	PRESSURE VESSEL	100	.375	33.1	1	TBD	TBD
H2O	80	218	1MS,	PRESSURE VESSEL	PRESSURE VESSEL	30	TBD	76.0	8	TBD	TBD
H2O	84	205	1MS,	PRESSURE VESSEL	ACCUMULATORS	TBD	.25	3.2	1	TBD	TBD
H2O	86	105	1CCLSL, MMW	PRESSURE VESSEL	CONDENSATE WATER	44.9	TBD	108.0	2	TBD	TBD
H2O	87	104	1CCLSL, MMW	PRESSURE VESSEL	EMERGENCY WASH WATER	44.9	TBD	128.0	2	TBD	TBD
H2O	89	112	1CCLSL, MMW	PRESSURE VESSEL	HYGIENE WATER	44.9	TBD	000.0	1	TBD	TBD
H2O	94	102	1CCLSL, MMW	PRESSURE VESSEL	POTABLE WATER	44.9	TBD	166.0	4	TBD	TBD
H2O	95	15	1USL, PFS	PRESSURE VESSEL	PROCESS WATER	100	.375	000.3	1	TBD	TBD
H2O	96	110	1CCLSL, MMW	PRESSURE VESSEL	PROCESSED HYGIENE WATER	44.9	TBD	315.0	2	TBD	TBD
H2O	98	21	1USL, PFS	PRESSURE VESSEL	STORAGE, CONT.	50	.375	15.4	1	TBD	TBD
H2O	102	111	1CCLSL, MMW	PRESSURE VESSEL	WASTE HYGIENE WATER	44.9	TBD	292.5	2	TBD	TBD
H2O	109	13	1USL, PFS	SENSOR	FLOW METER	100	.375	2.0	2	TBD	TBD
H2O	117	213	1MS,	SENSOR	PRESSURE	30	.25	0.5	28	MOOG, CARLETON GROUP	2731-0001-5
H2O	117	193	1MFS,	SENSOR	PRESSURE	30	.25	0.5	14	MOOG, CARLETON GROUP	2731-0001-5
H2O	123	22	1USL, PFS	SENSOR	DELTA PRESSURE	100	.375	0.5	1	TBD	TBD
H2O	124	25	1USL, PFS	SENSOR	QUALITY METER	100	.375	2.2	1	TBD	TBD

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TABLE 2.3-13 FLUID SYSTEM HARDWARE - H₂O (CONTINUED)

USAGE (MEDIA)	ITEM NUMBER	PROGRAM APPLICATION	COMPONENT TYPE	SUB-TYPE	PRESSURE HEAD (psi)	PORT SIZE (in)	APPROX. MASS (lb)	QUANTITY REQUIRED	VENDOR	VENOR PART NUMBER
H ₂ O	125	60 (USL_PMS)	SENSOR	QUALITY MONITOR	TBD	.25	22.1	2	TBD	TBD
H ₂ O	127	214 (INS,	SENSOR	TEMPERATURE	TBD	.30	0.1	20	TBD	TBD
H ₂ O	132	62 (USL_PMS)	SENSOR	TEMPERATURE	TBD	.25	0.1	1	TBD	TBD
H ₂ O	133	211 (INS,	VALVE	CHECK	TBD	.30	0.5	6	VACCO INDUSTRIES	VID10716-01
H ₂ O	133	160 (INSF,	VALVE	CHECK	TBD	.25	0.5	6	VACCO INDUSTRIES	VID10716-01
H ₂ O	137	17 (USL_PTS	VALVE	CHECK	TBD	.160	.375	2	TBD	TBD
H ₂ O	141	160 (INSF,	VALVE	ELECTRIC	TBD	.30	.25	1.4	MARSHAL COMPONENTS INC.	15613
H ₂ O	147	32 (USL_PTS	VALVE	ELECTRIC	TBD	.160	.375	1.7	MOOG, SPACE PRODUCTS DIVISION	52-178
H ₂ O	151	209 (INS,	VALVE	ELECTRIC	TBD	.30	.60	TBD	TBD	TBD
H ₂ O	154	20 (USL_PMS	VALVE	FLUSH RELIEF	TBD	.160	.375	0.3	TBD	TBD
H ₂ O	161	210 (INS,	VALVE	RELIEF	TBD	.30	.25	1.0	TBD	TBD
H ₂ O	161	165 (INS,	VALVE	RELIEF	TBD	.30	.25	1.0	TBD	TBD

TABLE 2.3-14 FLUID SYSTEM HARDWARE - H₂O, CO₂ AND GH₂

USAGE (MEDIA)	ITEM NUMBER	PROGRAM APPLICATION	COMPONENT TYPE	SUB-TYPE	PRESSURE HEAD (psi)	PORT SIZE (in)	APPROX. MASS (lb)	QUANTITY REQUIRED	VENDOR	VENOR PART NUMBER
HO, CO ₂ , GH ₂	32	91 (ECLAS_AM	NASC	ELECTROLYTIC UNIT, COM	TBD	.200	232.0	4	TBD	TBD

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TABLE 2.3-15 FLUID SYSTEM HARDWARE - HALON 1301

USAGE (MEDIA)	ITEM NUMBER	PROGRAM APPLICATION	COMPONENT TYPE	SUB-TYPE	PRESSURE RELIEF (psi)	PORT SIZE (in)	APPROX. WEIGHT (lb)	QUANTITY REQUIRED	VENDOR	VENOR PART NUMBER
HALON 1301	28	101	ECLES, TDG	M1 SC	CONTROLLER, PWD	500	N/A	2.0	TBD	TBD
HALON 1301	99	100	ECLES, TDG	PRESSURE VESSEL	FIRE SUPPRESSANT	500	TBD	6.0	TBD	TBD

TABLE 2.3-16 FLUID SYSTEM HARDWARE - LHe

USAGE (MEDIA)	ITEM NUMBER	PROGRAM APPLICATION	COMPONENT TYPE	SUB-TYPE	PRESSURE RELIEF (psi)	PORT SIZE (in)	APPROX. WEIGHT (lb)	QUANTITY REQUIRED	VENDOR	VENOR PART NUMBER
LHE	39	77	ISUL, PWN	M1 SC	FLUX NOSE	300	.75	0.6	TBD	TBD

TABLE 2.3-17 FLUID SYSTEM HARDWARE - LN2

USAGE (MEDIA)	ITEM NUMBER	PROGRAM APPLICATION	COMPONENT TYPE	SUB-TYPE	PRESSURE RELIEF (psi)	PORT SIZE (in)	APPROX. WEIGHT (lb)	QUANTITY REQUIRED	VENDOR	VENOR PART NUMBER
LN2	29	59	ISUL, PWN	M1 SC	CARD UNIT, LN2 PRODUCTION	300	.25	33.0	1	TBD
LN2	93	114	ECLES, ACS	PRESSURE VESSEL		TBD	170.0	2	TBD	TBD

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TABLE 2.3-18 FLUID SYSTEM HARDWARE - OXIDIZERS

USAGE (MEDIA)	SHEET ITEM NUMBER	PROGRAM APPLICATION	COMPONENT TYPE	SUB-TYPE	PRESSURE HEAD (psi)	PORT SIZE (in)	APPROX. MASS (lb)	QUANTITY REQUIRED	VENDOR PART NUMBER
OXIDIZERS	3 195	IMPS.	DISCONNECT		15	.375	0.4	16	SYNTRICS INC.
OXIDIZERS	25 206	IMPS.	MISC	COPM RESOR	100	.5	30.0	2	TBD
OXIDIZERS	78 201	IMPS.	PRESSURE VESSEL		100	.5	101.0	2	TBD
OXIDIZERS	85 56	IMPS.	PRESSURE VESSEL	ACCUMULATORS	35	.25/.5	6.3	2	TBD
OXIDIZERS	103 190	IMPS.	REGULATOR	DOWNTSTREAM	300/75	.25	0.3	2	EATON CONSOLIDATED CONTROLS CORP.
OXIDIZERS	139 106	IMPS.	VALVE	CHCK	300	.5	0.2	12	MAROTTA SCIENTIFIC CONTROLS
OXIDIZERS	146 175	IMPS.	VALVE	ELECTRIC	15	.375	0.6	34	MIGHT COMPONENTS INC.
OXIDIZERS	164 182	IMPS.	VALVE	RELIEF	300	.5	2.0	2	TBD

TABLE 2.3-19 FLUID SYSTEM HARDWARE - REDUCERS, OXIDIZERS, AND INERTS

USAGE (MEDIA)	SHEET ITEM NUMBER	PROGRAM APPLICATION	COMPONENT TYPE	SUB-TYPE	PRESSURE HEAD (psi)	PORT SIZE (in)	APPROX. MASS (lb)	QUANTITY REQUIRED	VENDOR PART NUMBER
INERTS	118 167	IMPS.	SENSOR	PRESSURE	300	.25	0.5	42	TELEDYNE TARRA

TABLE 2.3-20 FLUID SYSTEM HARDWARE - REDUCERS

USAGE (MEDIA)	SHEET ITEM NUMBER	PROGRAM APPLICATION	COMPONENT TYPE	SUB-TYPE	PRESSURE HEAD (psi)	PORT SIZE (in)	APPROX. MASS (lb)	QUANTITY REQUIRED	VENDOR PART NUMBER
REDUCERS	1 186	IMPS. LANS	DISCONNECT		15	.25	0.0	12	SYNTRICS INC.
REDUCERS	1 197	IMPS. ICCLAS	DISCONNECT		100	.25	0.0	2	SYNTRICS INC.
REDUCERS	1 198	IMPS. ATT PAYLOADS	DISCONNECT		000	.25	0.0	2	SYNTRICS INC.
REDUCERS	24 201	IMPS.	MISC	COMPRESSOR	300	.25	30.0	2	TBD
REDUCERS	73 202	IMPS.	PRESSURE VESSEL	ACCUMULATORS	300	.25	101.0	4	TBD
REDUCERS	85 204	IMPS.	PRESSURE VESSEL	DOWNTSTREAM	300/15	.25/.5	8.3	2	TBD
REDUCERS	103 189	IMPS.	REGULATOR		300/15	.25	0.3	2	EATON CONSOLIDATED CONTROLS CORP.
REDUCERS	134 187	IMPS.	VALVE	CHCK	300	.25	0.5	14	VACCO INDUSTRIES
REDUCERS	140 176	IMPS.	VALVE	ELECTRIC	150	.25	1.5	40	MIGHT COMPONENTS INC.
REDUCERS	143 177	IMPS.	VALVE	ELECTRIC	180	.25	0.5	2	MOOG, SPACE PRODUCTS DIVISION
REDUCERS	162 183	IMPS.	VALVE	RELIEF	300	.25	2.0	6	TBD

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TABLE 2.3-21 FLUID SYSTEM HARDWARE - SFHe

ITEM NO.	PROGRAM APPLICATION	COMPONENT TYPE	SUB-TYPE	PRESSURE MECH (psi-a)	PORT SIZE (in)	APPROX. MASS (lb)	QUANTITY REQUIRED	VENDOR		VENDOR PART NUMBER
								VACUUM	VACUUM	
SFHE 5 149 ISFRY,		DISCONNECT	DISCONNECT	VACUUM	1.0	2.0	2	TBD	TBD	TBD
SFHE 9 150 ISFRY,		DISCONNECT	EMERGENCY	VACUUM	1.0	3.0	2	TBD	TBD	TBD
SFHE 20 160 ISFRY,		MISC	BURST DISK	VACUUM	1.0	0.9	2	TBD	TBD	TBD
SFHE 39 151 ISFRY,		MISC	FLEX HOSE	VACUUM	1.0	0.0	2	TBD	TBD	TBD
SFHE 44 169 ISFRY,		MISC	HEAT EXCHANGER	VACUUM	MULTIPLE	3.0	1	TBD	TBD	TBD
SFHE 49 167 ISFRY,		MISC	POROUS PLUG	VACUUM	.375	0.3	1	TBD	TBD	TBD
SFHE 50 168 ISFRY,		MISC	POROUS PLUG	VACUUM	1.0	1.2	1	TBD	TBD	TBD
SFHE 56 164 ISFRY,		MISC	PUMP, FP	VACUUM	1.0	0.8	2	TBD	TBD	TBD
SFHE 59 165 ISFRY,		MISC	PUMP, VACUUM	VACUUM	.375	0.0	1	TBD	TBD	TBD
SFHE 61 166 ISFRY,		MISC	PUMP, VACUUM GAGE, ION	VACUUM	.5	3.0	1	TBD	TBD	TBD
SFHE 67 162 ISFRY,		MISC	VENT ASST, NON-PROPULSIVE	VACUUM	.375	0.3	1	TBD	TBD	TBD
SFHE 68 161 ISFRY,		MISC	VENT ASST, NON-PROPULSIVE	VACUUM	1.0	0.3	1	TBD	TBD	TBD
SFHE 69 163 ISFRY,		MISC	VENT ASST, NON-PROPULSIVE	VACUUM	MULTIPLE	0.5	1	TBD	TBD	TBD
SFHE 90 147 ISFRY,		PRESSURE VESSEL	ISOCOIL	VACUUM	MULTIPLE	750.0	1	TBD	TBD	TBD
SFHE 97 148 ISFRY,		PRESSURE VESSEL	STIFFENED MONOCOQUE	VACUUM	MULTIPLE	500.0	1	TBD	TBD	TBD
SFHE 111 174 ISFRY,		SENSOR	FLOW METER, GAS	VACUUM	.375	1.0	1	TBD	TBD	TBD
SFHE 112 173 ISFRY,		SENSOR	FLOW METER, LIQUID	VACUUM	1.0	1.0	2	TBD	TBD	TBD
SFHE 113 172 ISFRY,		SENSOR	MASS METER	VACUUM	TBD	0.1	1	TBD	TBD	TBD
SFHE 114 170 ISFRY,		SENSOR	PRESSURE	VACUUM	.25	0.8	5	TBD	TBD	TBD
SFHE 126 171 ISFRY,		SENSOR	TEMPERATURE	VACUUM	.25	0.2	15	TBD	TBD	TBD
SFHE 157 155 ISFRY,		VALVE	HANDL, SHUT-OFF	VACUUM	1.0	1.0	1	TBD	TBD	TBD
SFHE 165 158 ISFRY,		VALVE	RELIEF	VACUUM	1.0	3.0	2	TBD	TBD	TBD
SFHE 166 159 ISFRY,		VALVE	RELIEF	VACUUM	1.0	2.0	1	TBD	TBD	TBD
SFHE 169 157 ISFRY,		VALVE	SEAL-OFF, VACUUM	VACUUM	0.5	0.5	4	TBD	TBD	TBD
SFHE 170 156 ISFRY,		VALVE	SEAL-OFF, VACUUM	VACUUM	1.0	1.0	1	TBD	TBD	TBD
SFHE 171 154 ISFRY,		VALVE	SOLENOID, LATCHING	VACUUM	1.0	3.0	4	TBD	TBD	TBD
SFHE 174 152 ISFRY,		VALVE	SOLENOID, LATCHING W/BPR	VACUUM	.375	1.5	6	TBD	TBD	TBD
SFHE 175 153 ISFRY,		VALVE	SOLENOID, LATCHING W/BPR	VACUUM	1.0	4.0	22	TBD	TBD	TBD

TABLE 2.3-22 FLUID SYSTEM HARDWARE - TBD

USAGE (MEDIA)	SHEET NUMBER NO.	ITEM NUMBER NO.	PROGRAM APPLICATION	COMPONENT TYPE	SUB-TYPE	PRESSURE MECH (psi)	PORT SIZE (in)	APPROX. WEIGHT (mass) (lb)	QUANTITY REQUIRED	VENDOR	VENDOR PART NUMBER
TBD	18	54	JURL-PHN	ENGINE	BURNER, CATALYTIC	TBD	2.0	60.0	2	TBD	TBD
TBD	62	113	ECLES-ACS	MISC	REFRIGERATOR/FREEZER	TBD	TBD	586.0	3	TBD	TBD

TABLE 2.3-23 FLUID SYSTEM HARDWARE - URINE BRINE

USAGE (MEDIA)	SHEET NUMBER NO.	ITEM NUMBER NO.	PROGRAM APPLICATION	COMPONENT TYPE	SUB-TYPE	PRESSURE MECH (psi)	PORT SIZE (in)	APPROX. WEIGHT (mass) (lb)	QUANTITY REQUIRED	VENDOR	VENDOR PART NUMBER
URINE BRINE	19	116	ECLES-MIN	MISC	BRINE STORAGE	TBD	TBD	33.0	6	TBD	TBD

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2.4 FLUID SYSTEM HARDWARE BY INDIVIDUAL DETAIL DATA SHEET

The following listings are detailed descriptions of the individual components. Components that are described by specific vendor part numbers were assigned that number from the Martin Marietta Propulsion Component Database. Vendor part numbers that were assigned from the database, were assigned by matching the individual component requirements as they are known with the capabilities of existing flight qualified hardware. In all cases the assigned part number indicates only that the component characteristics matches the requirements. It does not necessarily imply that the component has been selected for the particular application. Other components may fit equally well and the component selected is therefore only considered a representative fit. The components with a vendor part number of TBD have not been assigned one by the design and information on a representative component is not currently available. In some cases a part number has been assigned by the design but the data sheet is not yet available due to a lack of information from the vendor or the data is not yet installed in the database. This information will be added to the databook as it becomes available. An index of the individual detailed data sheets is shown in Table 2.4-1, while the individual data sheets are compiled in Appendix A.

TABLE 2.4-1 FLUID SYSTEM HARDWARE INDIVIDUAL DATA SHEET INDEX

SHEET NO.	ITEM NO.	PROGRAM APPLICATION	COMPONENT TYPE	VENDOR	VENDOR PART NUMBER
1	30	USL,PFS	DISCONNECT.	SYMETRICS INC.	502040-1011 4 -3012
	48	USL,PMH	DISCONNECT.	SYMETRICS INC.	502040-1011 4 -3012
	196	IWFS, LABS	DISCONNECT.	SYMETRICS INC.	502040-1011 4 -3012
	197	IWFS,ECLSS	DISCONNECT.	SYMETRICS INC.	502040-1011 4 -3012
	198	IWFS,ATT PAYL	DISCONNECT.	SYMETRICS INC.	502040-1011 4 -3012
	199	IWFS,IMS	DISCONNECT.	SYMETRICS INC.	502040-1011 4 -3012
	200	IWFS,INS	DISCONNECT.	SYMETRICS INC.	502040-1011 4 -3012
2	11	USL,PFS	DISCONNECT.	PTI TECHNOLOGIES, INC.	7537191-4
3	33	USL,PFS	DISCONNECT.	SYMETRICS INC.	592002-3 4 -4
	58	USL,PMH	DISCONNECT.	SYMETRICS INC.	592002-3 4 -4
	195	IWFS,	DISCONNECT.	SYMETRICS INC.	592002-3 4 -4
4	37	USL,PMH	DISCONNECT.	TBD	TBD
5	149	SFHT,	DISCONNECT.	TBD	TBD
6	3	USL,VVS	DISCONNECT.	TBD	TBD
	64	USL,PMH	DISCONNECT.	TBD	TBD
7	217	IMS,	DISCONNECT.	TBD	TBD
8	125	INS,RS	DISCONNECT.	TBD	TBD
	134	INS,SS	DISCONNECT.	TBD	TBD
	142	INS,DS	DISCONNECT.	TBD	TBD
9	150	SFHT,	DISCONNECT, EMERGENCY	TBD	TBD
10	54	USL,PMH	ENGINE, BURNER, CATALYTIC	TBD	TBD
11	92	ECLSS,AR	FILTER, AVIONICS PARTICULATE	TBD	TBD
12	95	ECLSS,AR	FILTER, BACTERIA/PARTICULATE	TBD	TBD
13	14	USL,PFS	FILTER, INLINE	TBD	TBD
14	194	IWFS,	FILTER, INLINE	TBD	TBD
15	215	IMS,	FILTER, INLINE	TBD	TBD
16	124	INS,RS	FILTER, INLINE	TBD	TBD
	133	INS,SS	FILTER, INLINE	TBD	TBD
	141	INS,DS	FILTER, INLINE	TBD	TBD
17	39	USL,PMH	FILTER, INLINE	TBD	TBD
18	73	USL,PMH	FILTER, MULTIPLE	TBD	TBD
19	116	ECLSS,AR	MISC, BRINE STORAGE	TBD	TBD
20	160	SFHT,	MISC, BURST DISK	TBD	TBD
21	91	ECLSS,THC	MISC, CABIN COOLING PFG	TBD	TBD
22	99	ECLSS,AR	MISC, CATALYTIC OXIDIZER	TBD	TBD
23	94	ECLSS,AR	MISC, CO2 REDUCTION, BOSCH	TBD	TBD
24	207	IWFS,	MISC, COMPRESSOR	TBD	TBD
25	206	IWFS,	MISC, COMPRESSOR	TBD	TBD
26	67	USL,PMH	MISC, COMPRESSOR, REFRIGERATION	TBD	TBD

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TABLE 2.4-1 FLUID SYSTEM HARDWARE INDIVIDUAL DATA SHEET INDEX (CONTINUED)

SHEET NO.	ITEM NO.	PROGRAM APPLICATION	COMPONENT TYPE	VENDOR	VENDOR PART NUMBER
27	115	ECLSS, ACS	MISC. CONTROL, N2 RESUPPLY PRESSURE	TBD	TBD
28	101	ECLSS, FDS	MISC. CONTROLLER, PYRO	TBD	TBD
29	59	USL, PWH	MISC. CRYO UNIT, LN2 PRODUCTION	TBD	TBD
30	40	USL, PWH	MISC. DIFFUSER, SUCTION	TBD	TBD
31	103	ECLSS, WRM	MISC. DISPENSER, POTABLE WATER	TBD	TBD
32	97	ECLSS, AR	MISC. ELECTROLYSIS UNIT, KOH	TBD	TBD
33	109	ECLSS, WRM	MISC. EYEWASH	TBD	TBD
34	117	ECLSS, NM	MISC. FECAL STORAGE	TBD	TBD
35	35	USL, PFS	MISC. FLEX HOSE	TBD	TBD
36	7	USL, PFS	MISC. FLEX HOSE	TBD	TBD
37	12	USL, PFS	MISC. FLEX HOSE	TBD	TBD
38	72	USL, PWH	MISC. FLEX HOSE	TBD	TBD
39	151	SFHT,	MISC. FLEX HOSE	TBD	TBD
40	84	USL, PWH	MISC. FLEX HOSE, TEFLON LINED	TBD	TBD
41	78	USL, PWH	MISC. FLEX HOSE, TEFLON LINED	TBD	TBD
42	50	USL, PWH	MISC. FLEX HOSE, TEFLON LINED	TBD	TBD
43	69	USL, PWH	MISC. FLEX HOSE, TEFLON LINED	TBD	TBD
44	169	SFHT,	MISC. HEAT EXCHANGER	TBD	TBD
45	216	IMS,	MISC. HEATER	TBD	TBD
46	96	ECLSS, AR	MISC. MOLECULAR SIEVE, 4-BED	TBD	TBD
47	38	ECLSS, AR	MISC. MONITOR, ATMOSPHERE	TBD	TBD
48	106	ECLSS, WRM	MISC. MONITOR, WATER QUALITY	TBD	TBD
49	167	SFHT,	MISC. POROUS PLUG	TBD	TBD
50	168	SFHT,	MISC. POROUS PLUG	TBD	TBD
51	89	ECLSS, ACS	MISC. PRESSURE CONTROL SYSTEM	TBD	TBD
52	77	USL, PWH	MISC. PRETREATMENT UNIT, WASTE	TBD	TBD
53	108	ECLSS, WRM	MISC. PROCESSING UNIT, POTABLE WATER	TBD	TBD
54	107	ECLSS, WRM	MISC. PROCESSING UNIT, WASTE HYGIENE	TBD	TBD
55	23	USL, PFS	MISC. PUMP	TBD	TBD
56	70	USL, PWH	MISC. PUMP	TBD	TBD
57	208	IWFS,	MISC. PUMP	TBD	TBD
58	164	SFHT,	MISC. PUMP, FFP	TBD	TBD
59	165	SFHT,	MISC. PUMP, VACUUM	TBD	TBD
60	57	USL, PWH	MISC. PUMP, VACUUM	TBD	TBD

TABLE 2.4-1 FLUID SYSTEM HARDWARE INDIVIDUAL DATA SHEET INDEX (CONTINUED)

SHEET NO.	ITEM NO.	PROGRAM APPLICATION	COMPONENT TYPE	VENDOR	VENDOR PART NUMBER
61	166	SFH&T.	MISC. PUMP, VACUUM GAGE ION	TBD	TBD
62	113	ECLSS, ACS	MISC. REFRIGERATOR/FREEZER	TBD	TBD
63	45	USL, PWH	MISC. SEPARATOR, GAS/LIQUID	TBD	TBD
64	93	ECLSS, AR	MISC. SORBENT BED	TBD	TBD
65	61	USL, PWH	MISC. TIMES UNIT	HAMILTON STANDARD	TBD
66	81	USL, PWH	MISC. VACUUM UNIT, PORTABLE	TBD	TBD
67	162	SFH&T.	MISC. VENT ASSY, NON-PROPELLIVE	TBD	TBD
68	161	SFH&T.	MISC. VENT ASSY, NON-PROPELLIVE	TBD	TBD
69	163	SFH&T.	MISC. VENT ASSY, NON-PROPELLIVE	TBD	TBD
70	123	INS, RS	MISC. VENT ASSY, NON-PROPELLIVE	TBD	TBD
	132	INS, SS	MISC. VENT ASSY, NON-PROPELLIVE	TBD	TBD
71	16	USL, PFS	MISC. WATER PROCESSOR	TBD	TBD
72	203	IWFS.	PRESSURE VESSEL,	TBD	TBD
73	202	IWFS.	PRESSURE VESSEL,	TBD	TBD
74	27	USL, PFS	PRESSURE VESSEL,	TBD	TBD
75	28	USL, PFS	PRESSURE VESSEL,	TBD	TBD
76	19	USL, PFS	PRESSURE VESSEL,	TBD	TBD
77	65	USL, PWH	PRESSURE VESSEL,	TBD	TBD
78	201	IWFS.	PRESSURE VESSEL,	TBD	TBD
79	51	USL, PWH	PRESSURE VESSEL,	TBD	TBD
80	218	IWS.	PRESSURE VESSEL,	TBD	TBD
81	118	INS, RS	PRESSURE VESSEL,	TBD	TBD
82	128	INS, SS	PRESSURE VESSEL,	TBD	TBD
83	114	ECLSS, ACS	PRESSURE VESSEL,	TBD	TBD
84	205	IWFS.	PRESSURE VESSEL, ACCUMULATORS	TBD	TBD
85	56	IWFS.	PRESSURE VESSEL, ACCUMULATORS	TBD	TBD
	204	IWFS.	PRESSURE VESSEL, ACCUMULATORS	TBD	TBD
86	105	ECLSS, WRM	PRESSURE VESSEL, CONDENSATE WATER	TBD	TBD
87	104	ECLSS, WRM	PRESSURE VESSEL, EMERGENCY WASH WATER	TBD	TBD
88	100	ECLSS, PDS	PRESSURE VESSEL, FIRE SUPPRESSANT	TBD	TBD
89	112	ECLSS, WRM	PRESSURE VESSEL, HYGIENE WATER	TBD	TBD
90	147	SFH&T.	PRESSURE VESSEL, ISOGRID	TBD	TBD
91	44	USL, PWH	PRESSURE VESSEL, LIQUID WASTE	TBD	TBD
92	75	USL, PWH	PRESSURE VESSEL, MATERIAL TRANS. CONT.	TBD	TBD
93	29	USL, PFS	PRESSURE VESSEL, PORTABLE	TBD	TBD

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TABLE 2.4-1 FLUID SYSTEM HARDWARE INDIVIDUAL DATA SHEET INDEX (CONTINUED)

SHEET NO.	ITEM NO.	PROGRAM APPLICATION	COMPONENT TYPE	VENDOR	VENDOR PART NUMBER
94	102	ECLSS, NRM	PRESSURE VESSEL, POTABLE WATER	TBD	TBD
95	15	USL, PFS	PRESSURE VESSEL, PROCESS WATER	TBD	TBD
96	110	ECLSS, NRM	PRESSURE VESSEL, PROCESSED HYGIENE WATER	TBD	TBD
97	148	SFHT,	PRESSURE VESSEL, STIFFENED MONOCOQUE	TBD	TBD
98	21	USL, PFS	PRESSURE VESSEL, STORAGE CONT.	TBD	TBD
99	42	USL, PWH	PRESSURE VESSEL, WASTE CONTAINMENT	TBD	TBD
100	55	USL, PWH	PRESSURE VESSEL, WASTE GAS	TBD	TBD
101	68	USL, PWH	PRESSURE VESSEL, WASTE HOLDING	TBD	TBD
102	111	ECLSS, NRM	PRESSURE VESSEL, WASTE HYGIENE WATER	TBD	TBD
103	189	IMFS,	REGULATOR, DOWNSTREAM	EATON CONSOLIDATED CONTROL	13890 MODIFIED
	190	IMFS,	REGULATOR, DOWNSTREAM	EATON CONSOLIDATED CONTROL	13890 MODIFIED
104	191	IMFS,	REGULATOR, DOWNSTREAM	AERODYNE CONTROLS CORP.	3066-5-000 MODIFIED
	212	IMS,	REGULATOR, DOWNSTREAM	AERODYNE CONTROLS CORP.	3066-5-000 MODIFIED
105	24	USL, PFS	REGULATOR, DOWNSTREAM	FUTURECRAFT CORP.	400236 MODIFIED
106	87	ECLSS, ACS	REGULATOR, DOWNSTREAM	TBD	TBD
107	43	USL, PWH	REGULATOR, DOWNSTREAM	TBD	TBD
108	143	IMS, DS	REGULATOR, ELECTRONIC, W/RELIEF	TBD	TBD
109	13	USL, PFS	SENSOR, FLOW METER	TBD	TBD
110	41	USL, PWH	SENSOR, FLOW METER	TBD	TBD
111	174	SFHT,	SENSOR, FLOW METER, GAS	TBD	TBD
112	173	SFHT,	SENSOR, FLOW METER, LIQUID	TBD	TBD
113	172	SFHT,	SENSOR, MASS METER	TBD	TBD
114	170	SFHT,	SENSOR, PRESSURE	TBD	TBD
115	1	USL, VVS	SENSOR, PRESSURE	TBD	TBD
116	47	USL, PWH	SENSOR, PRESSURE	KULITE SEMICONDUCTOR PRODU	EMDE-1100-10
117	193	IMFS,	SENSOR, PRESSURE	HOOG, CARLETON GROUP	2731-0001-5
	213	IMS,	SENSOR, PRESSURE	HOOG, CARLETON GROUP	2731-0001-5
118	192	IMFS,	SENSOR, PRESSURE	TELEDYNE TABER	2403-200
119	145	IMS, DS	SENSOR, PRESSURE	IMO DELAVAL INC., CEC INST	615505 MODIFIED
120	18	USL, PFS	SENSOR, PRESSURE	STATHAM DIVISION, SOLARTRO	C29284/A MODIFIED
121	126	IMS, RS	SENSOR, PRESSURE	EATON CONSOLIDATED CONTROL	41SG197-2000AI MOD.
	135	IMS, SS	SENSOR, PRESSURE	EATON CONSOLIDATED CONTROL	41SG197-2000AI MOD.
	144	IMS, DS	SENSOR, PRESSURE	EATON CONSOLIDATED CONTROL	41SG197-2000AI MOD.
122	66	USL, PWH	SENSOR, PRESSURE	TBD	TBD
123	22	USL, PFS	SENSOR, DELTA PRESSURE	TBD	TBD
124	25	USL, PFS	SENSOR, QUALITY METER	TBD	TBD

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TABLE 2.4-1 FLUID SYSTEM HARDWARE INDIVIDUAL DATA SHEET INDEX (CONTINUED)

SHEET NO.	ITEM NO.	PROGRAM APPLICATION	COMPONENT TYPE	VENDOR	VENDOR PART NUMBER
125	60	USL, PWH	SENSOR, QUALITY MONITOR	TBD	TBD
126	171	SFHT,	SENSOR, TEMPERATURE	TBD	TBD
127	214	IWS,	SENSOR, TEMPERATURE	TBD	TBD
128	146	INS, DS	SENSOR, TEMPERATURE	TBD	TBD
129	6	USL, PFS	SENSOR, TEMPERATURE	TBD	TBD
130	127	INS, RS	SENSOR, TEMPERATURE	TBD	TBD
	136	INS, SS	SENSOR, TEMPERATURE	TBD	TBD
131	49	USL, PWH	SENSOR, TEMPERATURE	TBD	TBD
132	62	USL, PWH	SENSOR, TEMPERATURE	TBD	TBD
133	188	IWF5,	VALVE, CHECK	VACCO INDUSTRIES	VID10746-01
	211	IWS,	VALVE, CHECK	VACCO INDUSTRIES	VID10746-01
134	187	IWF5,	VALVE, CHECK	VACCO INDUSTRIES	4573779
135	10	USL, PFS	VALVE, CHECK	CIRCLE SEAL CONTROLS	CZ77A-40
136	36	USL, PWH	VALVE, CHECK	TBD	TBD
137	17	USL, PFS	VALVE, CHECK	TBD	TBD
138	71	USL, PWH	VALVE, CHECK	TBD	TBD
139	186	IWF5,	VALVE, CHECK	MAROTTA SCIENTIFIC CONTROL	806232
140	176	IWF5,	VALVE, ELECTRIC	WRIGHT COMPONENTS INC.	15983-1
141	180	IWF5,	VALVE, ELECTRIC	WRIGHT COMPONENTS INC.	15613
142	34	USL, PFS	VALVE, ELECTRIC	WRIGHT COMPONENTS INC.	15611-2
	178	IWF5,	VALVE, ELECTRIC	WRIGHT COMPONENTS INC.	15611-2
143	177	IWF5,	VALVE, ELECTRIC	MDOG, SPACE PRODUCTS DIVIS	53-159
144	179	IWF5,	VALVE, ELECTRIC	TBD	TBD
145	9	USL, PFS	VALVE, ELECTRIC	AMETEK, STRAZA DIVISION	435
146	175	IWF5,	VALVE, ELECTRIC	WRIGHT COMPONENTS INC.	15751
147	32	USL, PFS	VALVE, ELECTRIC	MDOG, SPACE PRODUCTS DIVIS	52-178
148	181	IWF5,	VALVE, ELECTRIC	WRIGHT COMPONENTS INC.	15975
149	38	USL, PWH	VALVE, ELECTRIC	AMETEK, STRAZA DIVISION	525-503
150	4	USL, VVS	VALVE, ELECTRIC	TBD	TBD
151	209	IWS,	VALVE, ELECTRIC	TBD	TBD
152	63	USL, PWH	VALVE, ELECTRIC	TBD	TBD
153	90	ECLSS, ACS	VALVE, EQUALIZATION	TBD	TBD
154	20	USL, PFS	VALVE, FLOW RESTRICTOR	TBD	TBD
155	8	USL, PFS	VALVE, FLOW RESTRICTOR	TBD	TBD
156	119	INS, RS	VALVE, MANUAL, SERVICE	VACCO INDUSTRIES	VIE10330-01

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TABLE 2.4-1 FLUID SYSTEM HARDWARE INDIVIDUAL DATA SHEET INDEX (CONTINUED)

SHEET NO.	ITEM NO.	PROGRAM APPLICATION	COMPONENT TYPE	VENDOR	VENDOR PART NUMBER
157	155	SFH7.	VALVE, MANUAL, SHUT-OFF	TBD	TBD
158	2	USL,VVS	VALVE, MANUAL, SHUT-OFF	TBD	TBD
159	5	USL,VVS	VALVE, MANUAL, SHUT-OFF	TBD	TBD
160	88	ECLSS,ACS	VALVE, RELIEF	TBD	TBD
161	185	IWFS,	VALVE, RELIEF	TBD	TBD
	210	IWS,	VALVE, RELIEF	TBD	TBD
162	183	IWFS,	VALVE, RELIEF	TBD	TBD
163	52	USL,PWH	VALVE, RELIEF	TBD	TBD
164	182	IWFS,	VALVE, RELIEF	TBD	TBD
165	158	SFH7,	VALVE, RELIEF	TBD	TBD
166	159	SFH7,	VALVE, RELIEF	TBD	TBD
167	53	USL,PWH	VALVE, RELIEF	TBD	TBD
168	122	INS,RS	VALVE, RELIEF W/BD	TBD	TBD
	131	INS,SS	VALVE, RELIEF W/BD	TBD	TBD
169	157	SFH7,	VALVE, SEAL-OFF, VACUUM	TBD	TBD
170	156	SFH7,	VALVE, SEAL-OFF, VACUUM	TBD	TBD
171	154	SFH7,	VALVE, SOLENOID, LATCHING	TBD	TBD
172	120	INS,RS	VALVE, SOLENOID, LATCHING	TBD	TBD
	129	INS,SS	VALVE, SOLENOID, LATCHING	TBD	TBD
	139	INS,DS	VALVE, SOLENOID, LATCHING	TBD	TBD
173	140	INS,DS	VALVE, SOLENOID, LATCHING	TBD	TBD
174	152	SFH7,	VALVE, SOLENOID, LATCHING W/BPR	TBD	TBD
175	153	SFH7,	VALVE, SOLENOID, LATCHING W/BPR	TBD	TBD
176	121	INS,RS	VALVE, TORQUE MOTOR	TBD	TBD
	130	INS,SS	VALVE, TORQUE MOTOR	TBD	TBD
	137	INS,DS	VALVE, TORQUE MOTOR	TBD	TBD
177	138	INS,DS	VALVE, TORQUE MOTOR	TBD	TBD
178	74	USL,PWH	VALVE, VENT ASSY	TBD	TBD

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2.5 FLUID SYSTEM HARDWARE TECHNOLOGY ASSESSMENT

All hardware listed in the previous sections was reviewed to determine technology status. This review indicated that most items are flight proven or flight qualified hardware. However, several items were identified that require various levels of technological development ranging from flight qualification testing to items which have not yet even been demonstrated in a laboratory environment. Table 2.5-1 lists these items and defines their current state of development.

Table 2.5-1 Fluid System Hardware Technology Assessment

HARDWARE SHEET NO.	COMPONENT TYPE	SUB-TYPE	PROGRAM APPLICATION	STATE OF DEVEL.	GENERAL COMMENTS
5	Disconnected		SFT	3	Moog Space Products has a development design which has been tested as a prototype.
9	Disconnected	Emergency	SFT	1	Currently, only at preliminary definition stage.
23	Miscellaneous	CO ₂ Reduction, Bosch	ECLSS, AR	5	Prototype unit has only been laboratory tested.
24	Miscellaneous	Compressor	IMFS	1	No design currently available to compress hydrogen and meet high life limits.
25	Miscellaneous	Compressor	IMFS	3	CLOGS compressor modified to meet the life req needs to be tested.
32	Miscellaneous	Electrolysis Unit	ECLSS, AR	5	Prototype unit has only been laboratory tested.
46	Miscellaneous	Molecular Sieve, 4 Bed	ECLSS, AR	5	Prototype unit has only been laboratory tested.
49	Miscellaneous	Porous Plug	SFT	1	Has never been demonstrated for this application.
50	Miscellaneous	Porous Plug	SFT	1	Has never been demonstrated for this application.
58	Miscellaneous	Pump, FEP	SFT	1	Has never been demonstrated for this application.
65	Miscellaneous	TIMES Unit	USL, PWH	5	Prototype unit has only been laboratory tested.
90	Miscellaneous	Pressure Vessel, Isogrid	SFT	1	Has never been demonstrated for this application.
97	Miscellaneous	Pressure Vessel, Stiffened Monocoque	SFT	4	Has never been demonstrated for this application.

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State of Devel. Value	State of Development Value Definitions
1	Basic Principles Observed and Reported
2	Conceptual Design Formulated
3	Conceptual Design Tested
4	Critical Hardware Tested
5	Preprototype Tested
6	Prototype Tested
7	Engineering Model Tested
8	Operational

2.6 FLUID SYSTEM HARDWARE COMMONALITY ASSESSMENT

Fluid system hardware commonality if pursued to the maximum extent, can provide the lowest life cycle cost system, by insuring the lowest component unit cost, the lowest piece part spares requirements and a more standard repair procedure in the event of a failure.

Hardware commonality for the fluid systems was first assessed by performing multiple sorts on the data shown in the first four sections. Sorting was done by component type, subtype and port size. The fluid media, pressure and weight were then compared to identify a range which could reasonable be lumped together. Table 2.6-1 lists the maximum extent of commonality which is practical given the data used to define the fluid systems discussed in EP 2.1 Space Station Program Fluid Inventory Databook.

Further fluid system hardware commonality should be considered at this time, however, in that the design of most systems can still be impacted with little or no penalty to the system designs. Several hardware items should be considered for use as a standard design item to insure the maximum practicable commonality. Items which could be considered are disconnects, pressure vessels, electrolysis units, compressors, pumps and water treatment units.

With the number of disconnects required and the type of service required, it would be beneficial to assemble the worst case design requirements and design a single disconnect that would meet all the Space Station needs. Another hardware item which should be considered for a common design approach is the gaseous pressure vessel. There are a number of gaseous pressure vessels used in the IWFS, INS, USL, JEM, Columbus and the Habitation Module that by adjusting the gas requirements, perhaps a single pressure vessel design could be used for multiple applications. The electrolysis units (EU's) could be of a common design by adjusting design requirements to allow for the same EU in both propulsion and the ECLSS applications. The same logic applies to the compressors, pumps and water treatment units and will be discussed in detail in EP 2.4 Space Station Fluid Management Systems Databook.

Table 2.6-1 FLUID SYSTEM HARDWARE COMMONALITY ASSESSMENT

COMPONENT TYPE	SUBTYPE	PORT SIZE	APPROX. MASS (LB)	VENDOR	VENDOR PART NUMBER	ITEM NO.	QUANTITY REQUIRED	PROGRAM APPLICATION	USAGE (MEDIA)	MEOP (PSIA)	
DISCONNECT		.25	0.8	SYNTETICS INC.	502040-1011 6 -3012	30	44	USL	H2O	100	
		1				48	7	USL	ALL	14.7	
						136	12	INF'S	REDUCERS	15	
						187	2	INF'S	REDUCERS	180	
						198	2	INF'S	REDUCERS	600	
						199	16	INF'S	H2O	30	
						200	4	INF'S	CN2	750	
DISCONNECT		.375	0.4	SYNTETICS INC.	532002-3 6 -4	33	36	USL	H2O	100	
						58	17	USL	ALL	14.7	
						195	16	INF'S	OXIDIZERS	15	
DISCONNECT		2.0	1.0	TBD	TBD	3	22	USL	ALL	.25 (TORR)	
				TBD	TBD	64	10	USL	ALL	14.7	
DISCONNECT		0		TBD	TBD	125	4	INS	CN2	4000	
						134	0	INS	CN2	4000	
						142	4	INS	ALL	4000	
FILTER	INLINE	16	TBD	TBD	TBD	124	4	INS	CN2	4000	
						133	0	INS	CN2	4000	
						141	4	INS	CN2	4000	
HESC	VENT ASSY. NON-PROPELLIVE	70	TBD	TBD	TBD	123	12	INS	CN2	4000	
						132	6	INS	CN2	4000	
PRESSURE VESSEL	ACCUMULATORS	85	.25/.5	8.3	TBD	56	2	INF'S	OXIDIZERS	35	
REGULATOR	DOWNTREAM	103	.25	0.3	EATON CONSOLIDATED CONTROLS CORP.	13890 MODIFIED	109	2	INF'S	REDUCERS	300/75
						190	2	INF'S	OXIDIZERS	300/75	
REGULATOR	DOWNTREAM	104	.25	0.6	AEROTRIC CONTROLS CORP.	3066-5-000 MODIFIED	191	6	INF'S	CN2	750/70
						212	4	INS	CN2	750/70	
SENSOR	PRESSURE	117	.25	0.5	NOOC, CARLETON GROUP	2731-0001-5	193	14	INF'S	H2O	30
SENSOR	PRESSURE	121	.25	0.6	EATON CONSOLIDATED CONTROLS CORP.	41SC197-2000A1 MOD.	126	16	INS	CN2	4000
						135	10	INS	CN2	4000	
						144	2	INS	CN2	4000	

TABLE 2.6-1 FLUID SYSTEM HARDWARE COMMONALITY ASSESSMENT (CONTINUED)

COMPONENT TYPE	SUBTYPE	SIGHT NUMBER	PART SIZE (INCH)	APPROX. WEIGHT (LB)	VENDOR	VENDOR PART NUMBER	ITEM NO. REQUIRED	ITEM QUANTITY	PROGRAM APPLICATION	USAGE (MEDIA)	MEOP (PSIA)
SENSOR	TEMPERATURE	130	.25	0.2	TBD	TBD	127	12	INS	GN2	4000
VALVE	CHECK	133	.25	0.5	VACCO INDUSTRIES	VID10746-01	136	6	INS	GN2	4000
VALVE	ELECTRIC	142	.25	0.5	WRIGHT COMPONENTS INC.	15611-2	148	6	INS	H2O	30
VALVE	RELIEF	161	.25	1.0	TBD	TBD	211	6	INS	H2O	30
VALVE	RELIEF W/RD	168	.25	TBD	TBD	TBD	176	6	INS	GN2	30
VALVE	SOLENOID, LATCHING	172	.25	1.6	TBD	TBD	185	1	INS	H2O	30
VALVE	TONQUE MOTOR	176	.25	1.6	TBD	TBD	210	6	INS	H2O	30
							132	12	INS	GN2	4000
							131	6	INS	GN2	4000
							120	24	INS	GN2	4000
							129	12	INS	GN2	4000
							139	3	INS	GN2	4000
							121	4	INS	GN2	4000
							130	6	INS	GN2	4000
							137	4	INS	GN2	4000

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APPENDIX A

This appendix contains individual component data sheets as they are currently available in Martin Marietta's propulsion component database. Sheet numbers not contained here are not currently available.

DISCONNECT DATA REPORT / DATA ENTRY DATE: 07/21/87

TYPE.....	MANUAL
SUBTYPE.....	FEMALE HALF
VENDOR.....	065, SYMETRICS INC.
VENDOR PART NUMBER.....	502040-1011
MARTIN MARIETTA PART NUMBER.....	-0-
QUALIFICATION STATUS.....	COMPLETE
PAST APPLICATIONS.....	ORBITER
PRINCIPAL MATERIAL OF CONSTRUCTION.....	17-4,-7,15-5,6061-T6
SEAL MATERIAL.....	RACO 321/302
OPERATING PRESSURE (PSIG).....	1050.00
PROOF PRESSURE (PSIG).....	1575.00
BURST PRESSURE (PSIG).....	2100.00
MAXIMUM TEMPERATURE LIMIT (F).....	160.000
MINIMUM TEMPERATURE LIMIT (F).....	-23.0000
THERMAL CYCLES (CYCLES).....	5.00000
CYCLE TEMPERATURES (RANGE,F).....	-0-
INLET PORT SIZE (IN).....	0.25000
OUTLET PORT SIZE (IN).....	-0-
PRESSURE DROP (PSID).....	19.0000
FLOW RATE.....	50 LBM/HR O2
PRESSURE DROP TEST FLUID.....	-0-
Cv (FLOW FACTOR).....	-0-
CONNECTED LEAKAGE.....	1.0E-5 SCCS HE
DISCONNECTED LEAKAGE.....	1.0E-5 SCCS HE
MAXIMUM CONTAMINATE ALLOWED (MICRONS).....	-0-
VIBRATION LIMITS (GRMS).....	29.4000
VIBRATION DURATION (MIN/AXIS).....	48.0000
SHOCK LIMITS (G's).....	25.0000
METHOD OF ACTUATION.....	MANUAL
CONNECT FORCE (LBF).....	-0-
DISCONNECT FORCE (LBF).....	-0-
CONNECT TORQUE (IN*LBF).....	30.0000
DISCONNECT TORQUE (IN*LBF).....	30.0000
WEIGHT (LBF).....	0.24000
OFFSET (IN).....	-0-
MISALIGNMENT (DEG).....	-0-
LIFETIME (YEARS).....	20.0000
CYCLE LIFE (CYCLES).....	1000.00
MTBF (HOURS).....	125000.
LEAD TIME (WEEKS).....	-0-
COMPATIBLE FLUIDS.....	07
ENVELOPE.....	3.16 IN X 1.25 IN DIA (APPROX)
COMMENTS.....	MATES-P/N 502040-3012, DISCON LKG VOL=0.12 SCC, 2-STAGE OPERATI
PRODUCTION COST.....	-0-
DESIGN AND DEVELOPMENT COST.....	-0-
STATE OF ART.....	-0-
COMPLEXITY FACTOR.....	-0-

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COMPONENT DATA SHEET 1B

DISCONNECT DATA REPORT / DATA ENTRY DATE: 07/21/87

TYPE.....	MANUAL
SUBTYPE.....	MALE HALF
VENDOR.....	065, SYMETRICS INC.
VENDOR PART NUMBER.....	502040-3012
MARTIN MARIETTA PART NUMBER.....	-0-
QUALIFICATION STATUS.....	COMPLETE
PAST APPLICATIONS.....	ORBITER
PRINCIPAL MATERIAL OF CONSTRUCTION.....	17-4,-7,15-5,6061-T6
SEAL MATERIAL.....	RACO 321/302
OPERATING PRESSURE (PSIG).....	1050.00
PROOF PRESSURE (PSIG).....	1575.00
BURST PRESSURE (PSIG).....	2100.00
MAXIMUM TEMPERATURE LIMIT (F).....	160.000
MINIMUM TEMPERATURE LIMIT (F).....	-23.0000
THERMAL CYCLES (CYCLES).....	5.00000
CYCLE TEMPERATURES (RANGE,F).....	-0-
INLET PORT SIZE (IN).....	0.25000
OUTLET PORT SIZE (IN).....	-0-
PRESSURE DROP (PSID).....	19.0000
FLOW RATE.....	50 LBM/HR O2
PRESSURE DROP TEST FLUID.....	-0-
Cv (FLOW FACTOR).....	-0-
CONNECTED LEAKAGE.....	1.0E-5 SCCS HE
DISCONNECTED LEAKAGE.....	1.0E-5 SCCS HE
MAXIMUM CONTAMINATE ALLOWED (MICRONS).....	-0-
VIBRATION LIMITS (GRMS).....	29.4000
VIBRATION DURATION (MIN/AXIS).....	48.0000
SHOCK LIMITS (G's).....	25.0000
METHOD OF ACTUATION.....	MANUAL
CONNECT FORCE (LBF).....	-0-
DISCONNECT FORCE (LBF).....	-0-
CONNECT TORQUE (IN*LBF).....	30.0000
DISCONNECT TORQUE (IN*LBF).....	30.0000
WEIGHT (LBF).....	0.58000
OFFSET (IN).....	-0-
MISALIGNMENT (DEG).....	-0-
LIFETIME (YEARS).....	20.0000
CYCLE LIFE (CYCLES).....	1000.00
MTBF (HOURS).....	125000.
LEAD TIME (WEEKS).....	-0-
COMPATIBLE FLUIDS.....	07
ENVELOPE.....	1.26 IN X 0.87 IN DIA (APPROX)
COMMENTS.....	MATES-P/N 502040-1011, DISCON LKG VOL=0.12 SCC, 2-STAGE OPERATIO
PRODUCTION COST.....	-0-
DESIGN AND DEVELOPMENT COST.....	-0-
STATE OF ART.....	-0-
COMPLEXITY FACTOR.....	-0-

DISCONNECT DATA REPORT / DATA ENTRY DATE: 08/12/87

TYPE.....	MANUAL
SUBTYPE.....	BOTH HALVES
VENDOR.....	045, PTI TECHNOLOGIES INC.
VENDOR PART NUMBER.....	7537191-4
MARTIN MARIETTA PART NUMBER.....	PD45S0140
QUALIFICATION STATUS.....	-0-
PAST APPLICATIONS.....	MACE - HYD. SERVICE
PRINCIPAL MATERIAL OF CONSTRUCTION.....	SEE DRAWING
SEAL MATERIAL.....	SEE DRAWING
OPERATING PRESSURE (PSIG).....	3000.00
PROOF PRESSURE (PSIG).....	4500.00
BURST PRESSURE (PSIG).....	6000.00
MAXIMUM TEMPERATURE LIMIT (F).....	160.000
MINIMUM TEMPERATURE LIMIT (F).....	-35.0000
THERMAL CYCLES (CYCLES).....	-0-
CYCLE TEMPERATURES (RANGE, F).....	-0-
INLET PORT SIZE (IN).....	0.25000
OUTLET PORT SIZE (IN).....	0.25000
PRESSURE DROP (PSID).....	-0-
FLOW RATE.....	-0-
PRESSURE DROP TEST FLUID.....	-0-
Cv (FLOW FACTOR).....	-0-
CONNECTED LEAKAGE.....	-0-
DISCONNECTED LEAKAGE.....	-0-
MAXIMUM CONTAMINATE ALLOWED (MICRONS).....	-0-
VIBRATION LIMITS (GRMS).....	-0-
VIBRATION DURATION (MIN/AXIS).....	-0-
SHOCK LIMITS (G's).....	-0-
METHOD OF ACTUATION.....	-0-
CONNECT FORCE (LBF).....	-0-
DISCONNECT FORCE (LBF).....	-0-
CONNECT TORQUE (IN*LBF).....	-0-
DISCONNECT TORQUE (IN*LBF).....	-0-
WEIGHT (LBF).....	-0-
OFFSET (IN).....	-0-
MISALIGNMENT (DEG).....	-0-
LIFETIME (YEARS).....	-0-
CYCLE LIFE (CYCLES).....	-0-
MTBF (HOURS).....	-0-
LEAD TIME (WEEKS).....	28
COMPATIBLE FLUIDS.....	28
ENVELOPE..... SEE DRAWING	
COMMENTS..... -0-	

PRODUCTION COST.....	-0-
DESIGN AND DEVELOPMENT COST.....	-0-
STATE OF ART.....	-0-
COMPLEXITY FACTOR.....	-0-

DISCONNECT DATA REPORT / DATA ENTRY DATE: 07/21/87

TYPE.....	MANUAL
SUBTYPE.....	MALE HALF
VENDOR.....	065, SYMETRICS INC.
VENDOR PART NUMBER.....	592002-3
MARTIN MARIETTA PART NUMBER.....	-0-
QUALIFICATION STATUS.....	COMPLETE
PAST APPLICATIONS.....	ORBITER
PRINCIPAL MATERIAL OF CONSTRUCTION.....	17-4, 17-7, 316
SEAL MATERIAL.....	-0-
OPERATING PRESSURE (PSIG).....	100.000
PROOF PRESSURE (PSIG).....	200.000
BURST PRESSURE (PSIG).....	400.000
MAXIMUM TEMPERATURE LIMIT (F).....	360.000
MINIMUM TEMPERATURE LIMIT (F).....	-65.0000
THERMAL CYCLES (CYCLES).....	5.00000
CYCLE TEMPERATURES (RANGE,F).....	-65 TO 275
INLET PORT SIZE (IN).....	0.37500
OUTLET PORT SIZE (IN).....	-0-
PRESSURE DROP (PSID).....	4.00000
FLOW RATE.....	2.0 GPM
PRESSURE DROP TEST FLUID.....	-0-
Cv (FLOW FACTOR).....	-0-
CONNECTED LEAKAGE.....	1.0E-4 SCCS HE
DISCONNECTED LEAKAGE.....	1.0E-4 SCCS HE
MAXIMUM CONTAMINATE ALLOWED (MICRONS).....	-0-
VIBRATION LIMITS (GRMS).....	29.4000
VIBRATION DURATION (MIN/AXIS).....	48.0000
SHOCK LIMITS (G's).....	25.0000
METHOD OF ACTUATION.....	MANUAL
CONNECT FORCE (LBF).....	30.0000
DISCONNECT FORCE (LBF).....	30.0000
CONNECT TORQUE (IN*LBF).....	-0-
DISCONNECT TORQUE (IN*LBF).....	-0-
WEIGHT (LBF).....	0.16000
OFFSET (IN).....	-0-
MISALIGNMENT (DEG).....	-0-
LIFETIME (YEARS).....	20.0000
CYCLE LIFE (CYCLES).....	500.000
MTBF (HOURS).....	117000.
LEAD TIME (WEEKS).....	-0-
COMPATIBLE FLUIDS.....	-0-
ENVELOPE.....	1.19 IN X 0.94 IN DIA (APPROX)
COMMENTS.....	MATES-P/N 592002-4, HYDRL FLUIDS, PSIG=PSI, DISCON LKG VOL=0.02 SC
PRODUCTION COST.....	-0-
DESIGN AND DEVELOPMENT COST.....	-0-
STATE OF ART.....	-0-
COMPLEXITY FACTOR.....	-0-

DISCONNECT DATA REPORT / DATA ENTRY DATE: 07/21/87

TYPE..... MANUAL
SUBTYPE..... FEMALE HALF
VENDOR..... 065, SYMETRICS INC.
VENDOR PART NUMBER..... 592002-4
MARTIN MARIETTA PART NUMBER..... -0-
QUALIFICATION STATUS..... COMPLETE
PAST APPLICATIONS..... ORBITER
PRINCIPAL MATERIAL OF CONSTRUCTION..... 17-4, 17-7, 316
SEAL MATERIAL..... -0-
OPERATING PRESSURE (PSIG)..... 100.000
PROOF PRESSURE (PSIG)..... 200.000
BURST PRESSURE (PSIG)..... 400.000
MAXIMUM TEMPERATURE LIMIT (F)..... 360.000
MINIMUM TEMPERATURE LIMIT (F)..... -65.0000
THERMAL CYCLES (CYCLES)..... 5.00000
CYCLE TEMPERATURES (RANGE,F)..... -65 TO 275
INLET PORT SIZE (IN)..... 0.37500
OUTLET PORT SIZE (IN)..... -0-
PRESSURE DROP (PSID)..... 4.00000
FLOW RATE..... 2.0 GPM
PRESSURE DROP TEST FLUID..... -0-
Cv (FLOW FACTOR)..... -0-
CONNECTED LEAKAGE..... 1.0E-4 SCCS HE
DISCONNECTED LEAKAGE..... 1.0E-4 SCCS HE
MAXIMUM CONTAMINATE ALLOWED (MICRONS)..... -0-
VIBRATION LIMITS (GRMS)..... 29.4000
VIBRATION DURATION (MIN/AXIS)..... 48.0000
SHOCK LIMITS (G's)..... 25.0000
METHOD OF ACTUATION..... MANUAL
CONNECT FORCE (LBF)..... 30.0000
DISCONNECT FORCE (LBF)..... 30.0000
CONNECT TORQUE (IN*LBF)..... -0-
DISCONNECT TORQUE (IN*LBF)..... -0-
WEIGHT (LBF)..... 0.18000
OFFSET (IN)..... -0-
MISALIGNMENT (DEG)..... -0-
LIFETIME (YEARS)..... 20.0000
CYCLE LIFE (CYCLES)..... 500.000
MTBF (HOURS)..... 117000.
LEAD TIME (WEEKS)..... -0-
COMPATIBLE FLUIDS..... -0-
ENVELOPE..... 1.42 IN X 1.06 IN DIA (APPROX)
COMMENTS..... MATES-P/N 592002-3, HYDRL FLUIDS, PSIG=PSI, DISCON LKG VOL=0.02 SC

PRODUCTION COST..... -0-
DESIGN AND DEVELOPMENT COST..... -0-
STATE OF ART..... -0-
COMPLEXITY FACTOR..... -0-

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COMPONENT DATA SHEET 103

PRESSURE REGULATOR DATA REPORT / DATA ENTRY DATE: 08/11/87

TYPE.....	MECHANICAL
SUBTYPE (INLET OR OUTLET REGULATION).....	OUTLET
MANUFACTURER.....	014, EATON CONSOLIDATED CONTROLS
MANUFACTURER'S PART NUMBER.....	13890 MODIFIED
MARTIN MARIETTA PART NUMBER.....	-0-
QUALIFICATION STATUS.....	COMPLETE
PAST APPLICATIONS.....	AEROBEE
PRINCIPAL MATERIAL OF CONSTRUCTION.....	2024-T351 ALUM
SEAL MATERIAL.....	-0-
SEAT MATERIAL.....	KEL-F
UPPER INLET OPERATING PRESSURE (PSIA).....	515.000
LOWER INLET OPERATING PRESSURE (PSIA).....	190.000
UPPER OUTLET OPERATING PRESSURE (PSIA).....	40.0000 MOD TO 75.00
LOWER OUTLET OPERATING PRESSURE (PSIA).....	40.0000 MOD TO 75.00
INLET PROOF PRESSURE (PSIG).....	1015.00
OUTLET PROOF PRESSURE (PSIG).....	1015.00
INLET BURST PRESSURE (PSIG).....	1515.00
OUTLET BURST PRESSURE (PSIG).....	1515.00
MAXIMUM OPERATING TEMPERATURE (F).....	160.000
MINIMUM OPERATING TEMPERATURE (F).....	-0-
THERMAL CYCLES (CYCLES).....	-0-
CYCLE TEMPERATURES (RANGE, F).....	-0-
INLET PORT SIZE (IN).....	0.25000
OUTLET PORT SIZE (IN).....	0.25000
PRESSURE DROP (PSID).....	-0-
FLOW RATE.....	0.17 SCFM @ 40 PSI
PRESSURE DROP TEST FLUID.....	N2
Cv (FLOW FACTOR).....	-0-
INTERNAL LEAKAGE.....	-0-
EXTERNAL LEAKAGE.....	0.0
MAXIMUM CONTAMINATE ALLOWED (MICRONS).....	-0-
VIBRATION LIMITS (GRMS).....	-0-
VIBRATION TIME (MIN/AXIS).....	-0-
SHOCK LIMITS (G's).....	-0-
REGULATION ACCURACY (%).....	0.30000
WEIGHT (LBF).....	-0-
LIFETIME (YEARS).....	100000.
CYCLE LIFE (CYCLES).....	-0-
MTBF (HOURS).....	-0-
LEAD TIME (WEEKS).....	04
COMPATIBLE FLUIDS.....	
ENVELOPE.....	1.56 IN X 2.00 IN X 5.19 IN
COMMENTS.....	PSIA = PSIG, PORTS- AND 10050, SPRING BALANCED

PRODUCTION COST.....	-0-
DESIGN AND DEVELOPMENT COST.....	-0-
STATE OF ART.....	-0-
COMPLEXITY FACTOR.....	-0-

TYPE.....	MECHANICAL
SUBTYPE (INLET OR OUTLET REGULATION).....	OUTLET
MANUFACTURER.....	001, AERODYNE CONTROLS CORPORATION
MANUFACTURER'S PART NUMBER.....	3066-5-000 MODIFIED
MARTIN MARIETTA PART NUMBER.....	-0-
QUALIFICATION STATUS.....	CURRENT
PAST APPLICATIONS.....	AWACS
PRINCIPAL MATERIAL OF CONSTRUCTION.....	ALLUMINUM ALLOY
SEAL MATERIAL.....	BUTYL
SEAT MATERIAL.....	-0-
UPPER INLET OPERATING PRESSURE (PSIA).....	850.000
LOWER INLET OPERATING PRESSURE (PSIA).....	60.0000
UPPER OUTLET OPERATING PRESSURE (PSIA).....	19.5000 MOD TO 30.00
LOWER OUTLET OPERATING PRESSURE (PSIA).....	-0-
INLET PROOF PRESSURE (PSIG).....	1500.00
OUTLET PROOF PRESSURE (PSIG).....	750.000
INLET BURST PRESSURE (PSIG).....	3000.00
OUTLET BURST PRESSURE (PSIG).....	1000.00
MAXIMUM OPERATING TEMPERATURE (F).....	160.000
MINIMUM OPERATING TEMPERATURE (F).....	-65.0000
THERMAL CYCLES (CYCLES).....	-0-
CYCLE TEMPERATURES (RANGE, F).....	-0-
INLET PORT SIZE (IN).....	0.25000
OUTLET PORT SIZE (IN).....	0.25000
PRESSURE DROP (PSID).....	-0-
FLOW RATE.....	15 SCFM, MAX
PRESSURE DROP TEST FLUID.....	AIR
Cv (FLOW FACTOR).....	-0-
INTERNAL LEAKAGE.....	.0003 SCCS SF6
EXTERNAL LEAKAGE.....	ZERO APPARENT
MAXIMUM CONTAMINATE ALLOWED (MICRONS).....	25.0000
VIBRATION LIMITS (GRMS).....	6.90000
VIBRATION TIME (MIN/AXIS).....	-0-
SHOCK LIMITS (G's).....	15.0000
REGULATION ACCURACY (%).....	15.0000
WEIGHT (LBF).....	0.55000
LIFETIME (YEARS).....	15.0000
CYCLE LIFE (CYCLES).....	100000.
MTBF (HOURS).....	-0-
LEAD TIME (WEEKS).....	23
COMPATIBLE FLUIDS.....	20
ENVELOPE.....	3.4 IN X 3.9 IN X 1.75 IN
COMMENTS.....	CYCLE LIFE IS ALSO MTBF
PRODUCTION COST.....	-0-
DESIGN AND DEVELOPMENT COST.....	-0-
STATE OF ART.....	-0-
COMPLEXITY FACTOR.....	-0-

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COMPONENT DATA SHEET 105

PRESSURE REGULATOR DATA REPORT / DATA ENTRY DATE: 05/14/87

TYPE.....	MECHANICAL
SUBTYPE (INLET OR OUTLET REGULATION).....	OUTLET
MANUFACTURER.....	021, FUTURECRAFT CORPORATION
MANUFACTURER'S PART NUMBER.....	400236 MODIFIED
MARTIN MARIETTA PART NUMBER.....	-0-
QUALIFICATION STATUS.....	QUALIFIED
PAST APPLICATIONS.....	TEAL RUBY SATELLITE
PRINCIPAL MATERIAL OF CONSTRUCTION.....	2024-T351 ALUM&CRES
SEAL MATERIAL.....	EPM & FLUOROSILICONE
SEAT MATERIAL.....	-0-
UPPER INLET OPERATING PRESSURE (PSIA).....	3700.00
LOWER INLET OPERATING PRESSURE (PSIA).....	500.000
UPPER OUTLET OPERATING PRESSURE (PSIA).....	60.0000 MOD TO 50
LOWER OUTLET OPERATING PRESSURE (PSIA).....	60.0000 MOD TO 50
INLET PROOF PRESSURE (PSIG).....	5550.00
OUTLET PROOF PRESSURE (PSIG).....	3578.00
INLET BURST PRESSURE (PSIG).....	9540.00
OUTLET BURST PRESSURE (PSIG).....	9540.00
MAXIMUM OPERATING TEMPERATURE (F).....	160.000
MINIMUM OPERATING TEMPERATURE (F).....	-22.0000
THERMAL CYCLES (CYCLES).....	8.00000
CYCLE TEMPERATURES (RANGE, F).....	-29 TO 124
INLET PORT SIZE (IN).....	0.25000
OUTLET PORT SIZE (IN).....	0.37500
PRESSURE DROP (PSID).....	-0-
FLOW RATE.....	0.0093 LBM/SEC
PRESSURE DROP TEST FLUID.....	GN2
Cv (FLOW FACTOR).....	-0-
INTERNAL LEAKAGE.....	1 SCCH
EXTERNAL LEAKAGE.....	1X10**-5 SCCS GN2
MAXIMUM CONTAMINATE ALLOWED (MICRONS).....	-0-
VIBRATION LIMITS (GRMS).....	13.4000
VIBRATION TIME (MIN/AXIS).....	-0-
SHOCK LIMITS (G's).....	-0-
REGULATION ACCURACY (%).....	6.70000
WEIGHT (LBF).....	1.80000
LIFETIME (YEARS).....	10.0000
CYCLE LIFE (CYCLES).....	-0-
MTBF (HOURS).....	-0-
LEAD TIME (WEEKS).....	26
COMPATIBLE FLUIDS.....	01
ENVELOPE.....	9.25 IN. X 2.63 IN. X 1.75 IN. (APPROX.)
COMMENTS.....	TUBE STUB FITTINGS
PRODUCTION COST.....	-0-
DESIGN AND DEVELOPMENT COST.....	-0-
STATE OF ART.....	-0-
COMPLEXITY FACTOR.....	-0-

SENSOR DATA REPORT / DATA ENTRY DATE: 07/10/87

TYPE.....	PRESSURE
SUBTYPE.....	STRAIN GAGE
VENDOR.....	030, KULITE SEMICONDUCTOR PROD. INC
VENDOR PART NUMBER.....	BMDE-1100-10
MARTIN MARIETTA PART NUMBER.....	-0-
QUALIFICATION STATUS.....	QUALIFIED
PAST APPLICATIONS.....	-0-
PRINCIPAL MATERIAL OF CONSTRUCTION.....	17-4PH & 15-5PH SS
SEAL MATERIAL.....	-0-
OPERATING PRESSURE (PSIG).....	10.0000
PROOF PRESSURE (PSIG).....	20.0000
BURST PRESSURE (PSIG).....	30.0000
MAXIMUM AMBIENT TEMPERATURE (F).....	250.000
MINIMUM AMBIENT TEMPERATURE (F).....	-40.0000
MAXIMUM MEDIA TEMPERATURE (F).....	-0-
MINIMUM MEDIA TEMPERATURE (F).....	-0-
THERMAL CYCLES (CYCLES).....	-0-
CYCLE TEMPERATURES (RANGE, F).....	-0-
VIBRATION LIMITS (GRMS).....	-0-
VIBRATION DURATION (MIN/AXIS).....	-0-
SHOCK LIMITS (G's).....	20.0000
EXTERNAL LEAKAGE.....	0.0
UNITS FOR SENSING RANGE.....	PSID
UPPER LIMIT OF SENSING RANGE.....	10.0000
LOWER LIMIT OF SENSING RANGE.....	0.00000
ACCURACY (% FULL SCALE).....	1.00000
INLET PORT SIZE (IN).....	0.25000
OUTLET PORT SIZE (IN).....	0.25000
OUTPUT SIGNAL.....	5 VDC
POWER REQUIREMENT.....	28 VDC
WEIGHT (LBF).....	0.37000
LIFETIME (YEARS).....	-0-
CYCLE LIFE (CYCLES).....	-0-
MTBF (HOURS).....	-0-
LEAD TIME (WEEKS).....	-0-
COMPATIBLE FLUIDS.....	-0-
ENVELOPE.....	4.2 IN X 1.0 IN DIA (APPROX)
COMMENTS.....	LAST DASH # = PRES, PORTS-MS33656-E4 7/16-20 UNF-3A

PRODUCTION COST.....	-0-
DESIGN AND DEVELOPMENT COST.....	-0-
STATE OF ART.....	-0-
COMPLEXITY FACTOR.....	-0-

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COMPONENT DATA SHEET 117

SENSOR DATA REPORT / DATA ENTRY DATE: 06/04/87

TYPE.....	PRESSURE
SUBTYPE.....	STRAIN GAGE
VENDOR.....	082, MOOG CARLETON GROUP
VENDOR PART NUMBER.....	2731-0001-5
MARTIN MARIETTA PART NUMBER.....	-0-
QUALIFICATION STATUS.....	QUALIFIED
PAST APPLICATIONS.....	SPACE SHUTTLE
PRINCIPAL MATERIAL OF CONSTRUCTION.....	-0-
SEAL MATERIAL.....	-0-
OPERATING PRESSURE (PSIG).....	20.0000
PROOF PRESSURE (PSIG).....	40.0000
BURST PRESSURE (PSIG).....	80.0000
MAXIMUM AMBIENT TEMPERATURE (F).....	120.000
MINIMUM AMBIENT TEMPERATURE (F).....	35.0000
MAXIMUM MEDIA TEMPERATURE (F).....	-0-
MINIMUM MEDIA TEMPERATURE (F).....	-0-
THERMAL CYCLES (CYCLES).....	-0-
CYCLE TEMPERATURES (RANGE,F).....	-0-
VIBRATION LIMITS (GRMS).....	-0-
VIBRATION DURATION (MIN/AXIS).....	-0-
SHOCK LIMITS (G's).....	-0-
EXTERNAL LEAKAGE.....	0.2 SCCM
UNITS FOR SENSING RANGE.....	PSIA
UPPER LIMIT OF SENSING RANGE.....	20.0000
LOWER LIMIT OF SENSING RANGE.....	0.00000
ACCURACY (% FULL SCALE).....	-0-
INLET PORT SIZE (IN).....	0.25000
OUTLET PORT SIZE (IN).....	-0-
OUTPUT SIGNAL.....	0-5 VDC
POWER REQUIREMENT.....	24-32 VDC
WEIGHT (LBF).....	0.46000
LIFETIME (YEARS).....	10.0000
CYCLE LIFE (CYCLES).....	-0-
MTBF (HOURS).....	-0-
LEAD TIME (WEEKS).....	-0-
COMPATIBLE FLUIDS.....	26
ENVELOPE.....	4.9 IN. X 1.25 IN. DIA. (APPROX)
COMMENTS.....	MS33649-4 FITTING. PRESSURES ARE PSIA
PRODUCTION COST.....	-0-
DESIGN AND DEVELOPMENT COST.....	-0-
STATE OF ART.....	-0-
COMPLEXITY FACTOR.....	-0-

SENSOR DATA REPORT / DATA ENTRY DATE: 07/16/87

TYPE..... PRESSURE
 SUBTYPE..... STRAIN GAGE
 VENDOR..... 069, TELEDYNE TABER
 VENDOR PART NUMBER..... 2403-200
 MARTIN MARIETTA PART NUMBER..... -0-
 QUALIFICATION STATUS..... COMPLETE
 PAST APPLICATIONS..... INSAT, DELTA, TRIDENT, INTELSAT
 PRINCIPAL MATERIAL OF CONSTRUCTION..... 17-4 PH, 304 SS
 SEAL MATERIAL..... -0-
 OPERATING PRESSURE (PSIG)..... 200.000
 PROOF PRESSURE (PSIG)..... 800.000
 BURST PRESSURE (PSIG)..... 1200.00
 MAXIMUM AMBIENT TEMPERATURE (F)..... 250.000
 MINIMUM AMBIENT TEMPERATURE (F)..... -100.000
 MAXIMUM MEDIA TEMPERATURE (F)..... -0-
 MINIMUM MEDIA TEMPERATURE (F)..... -0-
 THERMAL CYCLES (CYCLES)..... -0-
 CYCLE TEMPERATURES (RANGE,F)..... -0-
 VIBRATION LIMITS (GRMS)..... -0-
 VIBRATION DURATION (MIN/AXIS)..... -0-
 SHOCK LIMITS (G's)..... 30.0000
 EXTERNAL LEAKAGE..... -0-
 UNITS FOR SENSING RANGE..... PSIA, PSIS OR PSIG
 UPPER LIMIT OF SENSING RANGE..... 200.000
 LOWER LIMIT OF SENSING RANGE..... 0.00000
 ACCURACY (% FULL SCALE)..... 0.25000
 INLET PORT SIZE (IN)..... 0.25000
 OUTLET PORT SIZE (IN)..... -0-
 OUTPUT SIGNAL..... 0-5 VDC
 POWER REQUIREMENT..... 28 VDC +/- 8 VDC
 WEIGHT (LBF)..... 0.50000
 LIFETIME (YEARS)..... 20.0000
 CYCLE LIFE (CYCLES)..... -0-
 MTBF (HOURS)..... 97000.0
 LEAD TIME (WEEKS)..... 14
 COMPATIBLE FLUIDS..... -0-
 ENVELOPE..... 2.65 IN X 1.5 IN DIA
 COMMENTS..... LAST DASH # = PRES, PORT-MS33649, PSIS- 14.7 PSIA REF, EMI FILT

PRODUCTION COST..... -0-
 DESIGN AND DEVELOPMENT COST..... -0-
 STATE OF ART..... -0-
 COMPLEXITY FACTOR..... -0-

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COMPONENT DATA SHEET 119

SENSOR DATA REPORT / DATA ENTRY DATE: 07/06/87

TYPE.....	PRESSURE
SUBTYPE.....	STRAIN GAGE
VENDOR.....	011, IMO DELAVAL INC- CEC INSTR DI
VENDOR PART NUMBER.....	615505
MARTIN MARIETTA PART NUMBER.....	-0-
QUALIFICATION STATUS.....	IN PROCESS
PAST APPLICATIONS.....	MILSTAR
PRINCIPAL MATERIAL OF CONSTRUCTION.....	17-4 & 15-5 SS, TI
SEAL MATERIAL.....	-0-
OPERATING PRESSURE (PSIG).....	400.000
PROOF PRESSURE (PSIG).....	790.000
BURST PRESSURE (PSIG).....	1320.00
MAXIMUM AMBIENT TEMPERATURE (F).....	250.000
MINIMUM AMBIENT TEMPERATURE (F).....	-65.0000
MAXIMUM MEDIA TEMPERATURE (F).....	-0-
MINIMUM MEDIA TEMPERATURE (F).....	-0-
THERMAL CYCLES (CYCLES).....	-0-
CYCLE TEMPERATURES (RANGE, F).....	18.0000
VIBRATION LIMITS (GRMS).....	-0-
VIBRATION DURATION (MIN/AXIS).....	1500.00
SHOCK LIMITS (G's).....	-0-
EXTERNAL LEAKAGE.....	PSIA
UNITS FOR SENSING RANGE.....	400.000
UPPER LIMIT OF SENSING RANGE.....	0.00000
LOWER LIMIT OF SENSING RANGE.....	0.75000
ACCURACY (% FULL SCALE).....	0.25000
INLET PORT SIZE (IN).....	-0-
OUTLET PORT SIZE (IN).....	5 VDC
OUTPUT SIGNAL.....	28 VDC
POWER REQUIREMENT.....	0.43750
WEIGHT (LBF).....	10.0000
LIFETIME (YEARS).....	-0-
CYCLE LIFE (CYCLES).....	.120000E7
MTBF (HOURS).....	48
LEAD TIME (WEEKS).....	13, 16
COMPATIBLE FLUIDS.....	
ENVELOPE.....	5.5 IN X 1.25 IN DIA (APPROX)
COMMENTS.....	PSIG=PSIA, PORT=TUBE: 1.5 IN, COMPENSATED TEMP: -30 TO 160 F
PRODUCTION COST.....	-0-
DESIGN AND DEVELOPMENT COST.....	-0-
STATE OF ART.....	-0-
COMPLEXITY FACTOR.....	-0-

SENSOR DATA REPORT / DATA ENTRY DATE: 08/06/87

TYPE.....	PRESSURE
SUBTYPE.....	STRAIN GAGE
VENDOR.....	024, STATHAN DIVISION, SOLARTRON
VENDOR PART NUMBER.....	CZ 9284/A
MARTIN MARIETTA PART NUMBER.....	-0-
QUALIFICATION STATUS.....	-0-
PAST APPLICATIONS.....	-0-
PRINCIPAL MATERIAL OF CONSTRUCTION.....	INOX, PHYNOX, NI, 17-4
SEAL MATERIAL.....	-0-
OPERATING PRESSURE (PSIG).....	3000.00
PROOF PRESSURE (PSIG).....	6000.00
BURST PRESSURE (PSIG).....	9000.00
MAXIMUM AMBIENT TEMPERATURE (F).....	250.000
MINIMUM AMBIENT TEMPERATURE (F).....	-65.0000
MAXIMUM MEDIA TEMPERATURE (F).....	-0-
MINIMUM MEDIA TEMPERATURE (F).....	-0-
THERMAL CYCLES (CYCLES).....	-0-
CYCLE TEMPERATURES (RANGE, F).....	-0-
VIBRATION LIMITS (GRMS).....	-0-
VIBRATION DURATION (MIN/AXIS).....	-0-
SHOCK LIMITS (G's).....	-0-
EXTERNAL LEAKAGE.....	-0-
UNITS FOR SENSING RANGE.....	PSIA
UPPER LIMIT OF SENSING RANGE.....	3000.00
LOWER LIMIT OF SENSING RANGE.....	0.00000
ACCURACY (% FULL SCALE).....	0.25000
INLET PORT SIZE (IN).....	0.25000
OUTLET PORT SIZE (IN).....	-0-
OUTPUT SIGNAL.....	5 VDC
POWER REQUIREMENT.....	28 VOLT
WEIGHT (LBF).....	0.50688
LIFETIME (YEARS).....	-0-
CYCLE LIFE (CYCLES).....	-0-
MTBF (HOURS).....	-0-
LEAD TIME (WEEKS).....	-0-
COMPATIBLE FLUIDS.....	-0-
ENVELOPE.....	3.31 IN X 1.26 IN DIA (APPROX)
COMMENTS.....	HIGH OUTPUT UNIT, EPDM CASE, PSIG = PSIA
PRODUCTION COST.....	-0-
DESIGN AND DEVELOPMENT COST.....	-0-
STATE OF ART.....	-0-
COMPLEXITY FACTOR.....	-0-

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COMPONENT DATA SHEET 121

SENSOR DATA REPORT / DATA ENTRY DATE: 07/02/87

TYPE.....	PRESSURE
SUBTYPE.....	STRAIN GAGE
VENDOR.....	014, EATON CONSOLIDATED CONTROLS
VENDOR PART NUMBER.....	41SG197-2000A1 MODIFIED
MARTIN MARIETTA PART NUMBER.....	-0-
QUALIFICATION STATUS.....	COMPLETE
PAST APPLICATIONS.....	PEACEKEEPER/MX MISSILE SYS
PRINCIPAL MATERIAL OF CONSTRUCTION.....	STAINLESS STEEL
SEAL MATERIAL.....	-0-
OPERATING PRESSURE (PSIG).....	2000.00 MOD TO 4000
PROOF PRESSURE (PSIG).....	3000.00 MOD TO 6000
BURST PRESSURE (PSIG).....	4000.00 MOD TO 8000
MAXIMUM AMBIENT TEMPERATURE (F).....	200.000
MINIMUM AMBIENT TEMPERATURE (F).....	-30.0000
MAXIMUM MEDIA TEMPERATURE (F).....	-0-
MINIMUM MEDIA TEMPERATURE (F).....	-0-
THERMAL CYCLES (CYCLES).....	-0-
CYCLE TEMPERATURES (RANGE,F).....	-65, +250
VIBRATION LIMITS (GRMS).....	43.9000
VIBRATION DURATION (MIN/AXIS).....	-0-
SHOCK LIMITS (G's).....	8000.00
EXTERNAL LEAKAGE.....	-0-
UNITS FOR SENSING RANGE.....	PSIA
UPPER LIMIT OF SENSING RANGE.....	2000.00
LOWER LIMIT OF SENSING RANGE.....	0.00000
ACCURACY (% FULL SCALE).....	1.00000
INLET PORT SIZE (IN).....	0.25000
OUTLET PORT SIZE (IN).....	-0-
OUTPUT SIGNAL.....	0-5 VDC
POWER REQUIREMENT.....	28 VDC +/- 4 VDC
WEIGHT (LBF).....	0.56250
LIFETIME (YEARS).....	10.0000
CYCLE LIFE (CYCLES).....	-0-
MTBF (HOURS).....	40000.0
LEAD TIME (WEEKS).....	-0-
COMPATIBLE FLUIDS.....	08, 11
ENVELOPE.....	4.73 IN X 1.28 IN DIA (APPROX)
COMMENTS.....	PSIG=PSIA, PORT-MS33656E4, FILTER: 160HZ
PRODUCTION COST.....	-0-
DESIGN AND DEVELOPMENT COST.....	-0-
STATE OF ART.....	-0-
COMPLEXITY FACTOR.....	-0-

VALVE DATA REPORT / DATA ENTRY DATE: 05/14/87

TYPE..... CHECK
 SUBTYPE..... SERIES REDUNDANT
 VENDOR..... 072, VACCO INDUSTRIES
 VENDOR PART NUMBER..... V1D10746-01
 MARTIN MARIETTA PART NUMBER..... -0-
 QUALIFICATION STATUS..... 4 SAT. (HUGHES)
 PAST APPLICATIONS..... 304L
 PRINCIPAL MATERIAL OF CONSTRUCTION..... -0-
 SEAL MATERIAL..... TEFILON
 SEAT MATERIAL..... 250.000
 OPERATING PRESSURE (PSIG)..... 375.000
 PROOF PRESSURE (PSIG)..... 1000.00
 BURST PRESSURE (PSIG)..... -0-
 CRACKING PRESSURE (PSID)..... -0-
 RESEAT PRESSURE (PSID)..... -0-
 CHECK PRESSURE (PSID)..... 170.000
 MAXIMUM OPERATING TEMPERATURE (F)..... 10.0000
 MINIMUM OPERATING TEMPERATURE (F)..... -0-
 THERMAL CYCLES (CYCLES)..... -0-
 CYCLE TEMPERATURES (RANGE, F)..... 0.25000
 INLET PORT SIZE (IN)..... 0.25000
 OUTLET PORT SIZE (IN)..... -0-
 PRESSURE DROP (PSID)..... 1.87 SCFM
 FLOW RATE..... -0-
 PRESSURE DROP TEST FLUID..... -0-
 Cv (FLOW FACTOR)..... -0-
 INTERNAL LEAKAGE..... -0-
 EXTERNAL LEAKAGE..... -0-
 MAXIMUM CONTAMINATE ALLOWED (MICRONS)..... -0-
 VIBRATION LIMITS (GRMS)..... -0-
 VIBRATION DURATION (MIN/AXIS)..... -0-
 SHOCK LIMITS (G's)..... -0-
 METHOD OF ACTUATION..... -0-
 POWER REQUIREMENT..... -0-
 LATCHING MECHANISM..... -0-
 NORMAL STATUS (OPEN OR CLOSED)..... -0-
 OPEN RESPONSE TIME (MSEC)..... -0-
 CLOSE RESPONSE TIME (MSEC)..... 0.50000
 WEIGHT (LBF)..... -0-
 LIFETIME (YEARS)..... -0-
 CYCLE LIFE (CYCLES)..... -0-
 MTBF (HOURS)..... -0-
 LEAD TIME (WEEKS)..... 04, 13, 16
 COMPATIBLE FLUIDS.....
 ENVELOPE..... L = 6.82 IN.; DIA. = 1.4 IN.
 COMMENTS..... TUBES IN & OUT; W/FILTER

PRODUCTION COST..... -0-
 DESIGN AND DEVELOPMENT COST..... -0-
 STATE OF ART..... -0-
 COMPLEXITY FACTOR..... -0-

VALVE DATA REPORT / DATA ENTRY DATE: 05/14/87

TYPE..... CHECK
 SUBTYPE..... SERIES REDUNDANT
 VENDOR..... 072, VACCO INDUSTRIES
 VENDOR PART NUMBER..... 4573779
 MARTIN MARIETTA PART NUMBER..... -0-
 QUALIFICATION STATUS..... -0-
 PAST APPLICATIONS..... 2 SAT. (HUGHES)
 PRINCIPAL MATERIAL OF CONSTRUCTION..... 304L
 SEAL MATERIAL..... -0-
 SEAT MATERIAL..... TEFLON
 OPERATING PRESSURE (PSIG)..... 400.000
 PROOF PRESSURE (PSIG)..... 600.000
 BURST PRESSURE (PSIG)..... 1200.00
 CRACKING PRESSURE (PSID)..... -0-
 RESEAT PRESSURE (PSID)..... -0-
 CHECK PRESSURE (PSID)..... -0-
 MAXIMUM OPERATING TEMPERATURE (F)..... 150.000
 MINIMUM OPERATING TEMPERATURE (F)..... 30.0000
 THERMAL CYCLES (CYCLES)..... -0-
 CYCLE TEMPERATURES (RANGE, F)..... -0-
 INLET PORT SIZE (IN)..... 0.25000
 OUTLET PORT SIZE (IN)..... 0.25000
 PRESSURE DROP (PSID)..... -0-
 FLOW RATE..... 8.5 SCFM
 PRESSURE DROP TEST FLUID..... GHE
 Cv (FLOW FACTOR)..... -0-
 INTERNAL LEAKAGE..... -0-
 EXTERNAL LEAKAGE..... -0-
 MAXIMUM CONTAMINATE ALLOWED (MICRONS)..... -0-
 VIBRATION LIMITS (GRMS)..... -0-
 VIBRATION DURATION (MIN/AXIS)..... -0-
 SHOCK LIMITS (G's)..... -0-
 METHOD OF ACTUATION..... -0-
 POWER REQUIREMENT..... -0-
 LATCHING MECHANISM..... -0-
 NORMAL STATUS (OPEN OR CLOSED)..... -0-
 OPEN RESPONSE TIME (MSEC)..... -0-
 CLOSE RESPONSE TIME (MSEC)..... -0-
 WEIGHT (LBF)..... 0.50000
 LIFETIME (YEARS)..... -0-
 CYCLE LIFE (CYCLES)..... -0-
 MTBF (HOURS)..... -0-
 LEAD TIME (WEEKS)..... -0-
 COMPATIBLE FLUIDS..... 04
 ENVELOPE..... L = 6.32 IN.; DIA. = 1.3 IN.
 COMMENTS..... TUBES IN & OUT

PRODUCTION COST..... -0-
 DESIGN AND DEVELOPMENT COST..... -0-
 STATE OF ART..... -0-
 COMPLEXITY FACTOR..... -0-

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COMPONENT DATA SHEET 135

VALVE DATA REPORT / DATA ENTRY DATE: 06/02/87

TYPE.....	CHECK	-0-
SUBTYPE.....	012, CIRCLE SEAL CONTROLS	
VENDOR.....	C277A-4Q	
VENDOR PART NUMBER.....	-0-	
MARTIN MARIETTA PART NUMBER.....	-0-	
QUALIFICATION STATUS.....	MISSILE PROGRAM	
PAST APPLICATIONS.....	2024-T4	
PRINCIPAL MATERIAL OF CONSTRUCTION.....	-0-	
SEAL MATERIAL.....	BUNA-N	
SEAT MATERIAL.....	5000.00	
OPERATING PRESSURE (PSIG).....	-0-	
PROOF PRESSURE (PSIG).....	-0-	
BURST PRESSURE (PSIG).....	-0-	
CRACKING PRESSURE (PSID).....	-0-	
RESEAT PRESSURE (PSID).....	-0-	
CHECK PRESSURE (PSID).....	275.000	
MAXIMUM OPERATING TEMPERATURE (F).....	-65.0000	
MINIMUM OPERATING TEMPERATURE (F).....	-0-	
THERMAL CYCLES (CYCLES).....	-0-	
CYCLE TEMPERATURES (RANGE, F).....	0.25000	
INLET PORT SIZE (IN).....	0.25000	
OUTLET PORT SIZE (IN).....	-0-	
PRESSURE DROP (PSID).....	-0-	
FLOW RATE.....	-0-	
PRESSURE DROP TEST FLUID.....	-0-	
Cv (FLOW FACTOR).....	-0-	
INTERNAL LEAKAGE.....	-0-	
EXTERNAL LEAKAGE.....	-0-	
MAXIMUM CONTAMINATE ALLOWED (MICRONS).....	-0-	
VIBRATION LIMITS (GRMS).....	-0-	
VIBRATION DURATION (MIN/AXIS).....	-0-	
SHOCK LIMITS (G's).....	-0-	
METHOD OF ACTUATION.....	-0-	
POWER REQUIREMENT.....	-0-	
LATCHING MECHANISM.....	-0-	
NORMAL STATUS (OPEN OR CLOSED).....	-0-	
OPEN RESPONSE TIME (MSEC).....	-0-	
CLOSE RESPONSE TIME (MSEC).....	-0-	
WEIGHT (LBF).....	-0-	
LIFETIME (YEARS).....	-0-	
CYCLE LIFE (CYCLES).....	-0-	
MTBF (HOURS).....	-0-	
LEAD TIME (WEEKS).....	-0-	
COMPATIBLE FLUIDS.....		
ENVELOPE.....	-0-	
COMMENTS.....	USED WITH HOT GAS, SPRING MAT: 302SS	

PRODUCTION COST.....	-0-
DESIGN AND DEVELOPMENT COST.....	-0-
STATE OF ART.....	-0-
COMPLEXITY FACTOR.....	-0-

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COMPONENT DATA SHEET 139

VALVE DATA REPORT / DATA ENTRY DATE: 07/01/87

TYPE.....	CHECK
SUBTYPE.....	-0-
VENDOR.....	032, MAROTTA SCIENTIFIC CONTROLS
VENDOR PART NUMBER.....	806232
MARTIN MARIETTA PART NUMBER.....	-0-
QUALIFICATION STATUS.....	COMPLETE
PAST APPLICATIONS.....	DELTA PROPULSION SYS
PRINCIPAL MATERIAL OF CONSTRUCTION.....	316 & 302 SST
SEAL MATERIAL.....	MIL-R-25897
SEAT MATERIAL.....	CTFE
OPERATING PRESSURE (PSIG).....	450.000
PROOF PRESSURE (PSIG).....	910.000
BURST PRESSURE (PSIG).....	1210.00
CRACKING PRESSURE (PSID).....	0.30000
RESEAT PRESSURE (PSID).....	0.02000
CHECK PRESSURE (PSID).....	-0-
MAXIMUM OPERATING TEMPERATURE (F).....	100.000
MINIMUM OPERATING TEMPERATURE (F).....	0.00000
THERMAL CYCLES (CYCLES).....	-0-
CYCLE TEMPERATURES (RANGE, F).....	-0-
INLET PORT SIZE (IN).....	0.50000
OUTLET PORT SIZE (IN).....	0.50000
PRESSURE DROP (PSID).....	-0-
FLOW RATE.....	400 SCFM
PRESSURE DROP TEST FLUID.....	N2 @ 400 PSI INLET, 60 F
Cv (FLOW FACTOR).....	-0-
INTERNAL LEAKAGE.....	3.0 SCC/HR FROM 0-150 PSIG
EXTERNAL LEAKAGE.....	ZERO FROM 0-910 PSIG
MAXIMUM CONTAMINATE ALLOWED (MICRONS).....	10.0000
VIBRATION LIMITS (GRMS).....	-0-
VIBRATION DURATION (MIN/AXIS).....	-0-
SHOCK LIMITS (G's).....	-0-
METHOD OF ACTUATION.....	-0-
POWER REQUIREMENT.....	-0-
LATCHING MECHANISM.....	-0-
NORMAL STATUS (OPEN OR CLOSED).....	-0-
OPEN RESPONSE TIME (MSEC).....	-0-
CLOSE RESPONSE TIME (MSEC).....	-0-
WEIGHT (LBF).....	0.20000
LIFETIME (YEARS).....	-0-
CYCLE LIFE (CYCLES).....	-0-
MTBF (HOURS).....	-0-
LEAD TIME (WEEKS).....	14
COMPATIBLE FLUIDS.....	03, 06
ENVELOPE.....	2.314 IN X 1.00 IN DIA (APPROX)
COMMENTS.....	FITTINGS-MS33656E8, MODEL CVM508E-1A, EQ DIA=0.316 IN, CD=0.6

PRODUCTION COST.....	-0-
DESIGN AND DEVELOPMENT COST.....	-0-
STATE OF ART.....	-0-
COMPLEXITY FACTOR.....	-0-

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COMPONENT DATA SHEET 140

VALVE DATA REPORT / DATA ENTRY DATE: 04/14/87

TYPE.....	SOLENOID
SUBTYPE.....	DOUBLE ACTING,LATCH
VENDOR.....	075, WRIGHT COMPONENTS, INC.
VENDOR PART NUMBER.....	15983-1
MARTIN MARIETTA PART NUMBER.....	N/A
QUALIFICATION STATUS.....	-0-
PAST APPLICATIONS.....	GRO
PRINCIPAL MATERIAL OF CONSTRUCTION.....	CRES
SEAL MATERIAL.....	NITRILE
SEAT MATERIAL.....	VITON
OPERATING PRESSURE (PSIG).....	20.0000
PROOF PRESSURE (PSIG).....	4560.00
BURST PRESSURE (PSIG).....	7600.00
CRACKING PRESSURE (PSID).....	-0-
RESEAT PRESSURE (PSID).....	-0-
CHECK PRESSURE (PSID).....	-0-
MAXIMUM OPERATING TEMPERATURE (F).....	95.0000
MINIMUM OPERATING TEMPERATURE (F).....	-60.0000
THERMAL CYCLES (CYCLES).....	-0-
CYCLE TEMPERATURES (RANGE, F).....	-0-
INLET PORT SIZE (IN).....	0.25000
OUTLET PORT SIZE (IN).....	0.25000
PRESSURE DROP (PSID).....	-0-
FLOW RATE.....	EQ. DIA. = 0.055 IN.
PRESSURE DROP TEST FLUID.....	DISCHARGE COEFF. = 0.70
Cv (FLOW FACTOR).....	-0-
INTERNAL LEAKAGE.....	1 X 10**-4SCCS GHE@20-3000PSIA
EXTERNAL LEAKAGE.....	1 X 10**-6SCCS GHE@20-3000PSIA
MAXIMUM CONTAMINATE ALLOWED (MICRONS).....	-0-
VIBRATION LIMITS (GRMS).....	-0-
VIBRATION DURATION (MIN/AXIS).....	-0-
SHOCK LIMITS (G's).....	SOLENOID
METHOD OF ACTUATION.....	21-35 VDC
POWER REQUIREMENT.....	DETENT
LATCHING MECHANISM.....	-0-
NORMAL STATUS (OPEN OR CLOSED).....	30.0000
OPEN RESPONSE TIME (MSEC).....	30.0000
CLOSE RESPONSE TIME (MSEC).....	1.50000
WEIGHT (LBF).....	5.00000
LIFETIME (YEARS).....	10000.0
CYCLE LIFE (CYCLES).....	-0-
MTBF (HOURS).....	-0-
LEAD TIME (WEEKS).....	01, 04
COMPATIBLE FLUIDS.....	2.53 IN. X 1.187 IN. X 1.68 IN. (APPROX)
ENVELOPE.....	COMMENTS..... ALSO COMPATIBLE WITH GASEOUS NEON, ARGON, & ETHANE
PRODUCTION COST.....	-0-
DESIGN AND DEVELOPMENT COST.....	-0-
STATE OF ART.....	-0-
COMPLEXITY FACTOR.....	-0-

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COMPONENT DATA SHEET 141

VALVE DATA REPORT / DATA ENTRY DATE: 04/14/87

TYPE.....	SOLENOID
SUBTYPE.....	LATCHING
VENDOR.....	075, WRIGHT COMPONENTS, INC.
VENDOR PART NUMBER.....	15613
MARTIN MARIETTA PART NUMBER.....	N/A
QUALIFICATION STATUS.....	N/A
PAST APPLICATIONS.....	SPACE SHUTTLE
PRINCIPAL MATERIAL OF CONSTRUCTION.....	316 CRES
SEAL MATERIAL.....	VARIOUS
SEAT MATERIAL.....	EPR 515-8
OPERATING PRESSURE (PSIG).....	75.0000
PROOF PRESSURE (PSIG).....	115.000
BURST PRESSURE (PSIG).....	150.000
CRACKING PRESSURE (PSID).....	-0-
RESEAT PRESSURE (PSID).....	-0-
CHECK PRESSURE (PSID).....	-0-
MAXIMUM OPERATING TEMPERATURE (F).....	212.000
MINIMUM OPERATING TEMPERATURE (F).....	35.0000
THERMAL CYCLES (CYCLES).....	-0-
CYCLE TEMPERATURES (RANGE, F).....	-0-
INLET PORT SIZE (IN).....	0.25000
OUTLET PORT SIZE (IN).....	0.25000
PRESSURE DROP (PSID).....	0.20000
FLOW RATE.....	5.8 LBM/HOUR
PRESSURE DROP TEST FLUID.....	WATER @ 20 PSIA
Cv (FLOW FACTOR).....	-0-
INTERNAL LEAKAGE.....	5 SCCH HE @ 20-115 PSIG
EXTERNAL LEAKAGE.....	ZERO
MAXIMUM CONTAMINATE ALLOWED (MICRONS).....	-0-
VIBRATION LIMITS (GRMS).....	-0-
VIBRATION DURATION (MIN/AXIS).....	-0-
SHOCK LIMITS (G's).....	-0-
METHOD OF ACTUATION.....	SOLENOID
POWER REQUIREMENT.....	22-30 VDC
LATCHING MECHANISM.....	-0-
NORMAL STATUS (OPEN OR CLOSED).....	-0-
OPEN RESPONSE TIME (MSEC).....	100.000
CLOSE RESPONSE TIME (MSEC).....	100.000
WEIGHT (LBF).....	1.41000
LIFETIME (YEARS).....	-0-
CYCLE LIFE (CYCLES).....	1000.00
MTBF (HOURS).....	-0-
LEAD TIME (WEEKS).....	-0-
COMPATIBLE FLUIDS.....	26
ENVELOPE.....	4.54 IN. X 2.95 IN. X 1.80 IN. (APPROX.)
COMMENTS.....	OPERATING PRESSURE IS 75 PSIA
PRODUCTION COST.....	-0-
DESIGN AND DEVELOPMENT COST.....	-0-
STATE OF ART.....	-0-
COMPLEXITY FACTOR.....	-0-

VALVE DATA REPORT / DATA ENTRY DATE: 04/14/87

TYPE.....	SOLENOID
SUBTYPE.....	-0-
VENDOR.....	075, WRIGHT COMPONENTS, INC.
VENDOR PART NUMBER.....	15611-2
MARTIN MARIETTA PART NUMBER.....	N/A
QUALIFICATION STATUS.....	N/A
PAST APPLICATIONS.....	SPACE SHUTTLE
PRINCIPAL MATERIAL OF CONSTRUCTION.....	430/316 CRES
SEAL MATERIAL.....	ETHYLENE PROPYLENE
SEAT MATERIAL.....	TEFLON
OPERATING PRESSURE (PSIG).....	75.0000
PROOF PRESSURE (PSIG).....	150.000
BURST PRESSURE (PSIG).....	225.000
CRACKING PRESSURE (PSID).....	-0-
RESEAT PRESSURE (PSID).....	-0-
CHECK PRESSURE (PSID).....	-0-
MAXIMUM OPERATING TEMPERATURE (F).....	212.000
MINIMUM OPERATING TEMPERATURE (F).....	35.0000
THERMAL CYCLES (CYCLES).....	-0-
CYCLE TEMPERATURES (RANGE, F).....	-0-
INLET PORT SIZE (IN).....	0.25000
OUTLET PORT SIZE (IN).....	0.25000
PRESSURE DROP (PSID).....	-0-
FLOW RATE.....	EQ. DIA. = 0.125 IN.
PRESSURE DROP TEST FLUID.....	DISCHARGE COEFF. = 0.65
Cv (FLOW FACTOR).....	-0-
INTERNAL LEAKAGE.....	5 SCCH HE MAX
EXTERNAL LEAKAGE.....	ZERO
MAXIMUM CONTAMINATE ALLOWED (MICRONS).....	-0-
VIBRATION LIMITS (GRMS).....	-0-
VIBRATION DURATION (MIN/AXIS).....	-0-
SHOCK LIMITS (G's).....	-0-
METHOD OF ACTUATION.....	SOLENOID
POWER REQUIREMENT.....	22-30 VDC
LATCHING MECHANISM.....	-0-
NORMAL STATUS (OPEN OR CLOSED).....	CLOSED
OPEN RESPONSE TIME (MSEC).....	20.0000
CLOSE RESPONSE TIME (MSEC).....	20.0000
WEIGHT (LBF).....	0.50000
LIFETIME (YEARS).....	-0-
CYCLE LIFE (CYCLES).....	20000.0
MTBF (HOURS).....	-0-
LEAD TIME (WEEKS).....	-0-
COMPATIBLE FLUIDS.....	07
ENVELOPE.....	3.10 IN. X 2.125 IN. X 1.25 IN.
COMMENTS.....	OPERATING PRESSURE IS 75 PSIA
PRODUCTION COST.....	-0-
DESIGN AND DEVELOPMENT COST.....	-0-
STATE OF ART.....	-0-
COMPLEXITY FACTOR.....	-0-

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COMPONENT DATA SHEET 143

VALVE DATA REPORT / DATA ENTRY DATE: 06/02/87

TYPE.....	SOLENOID
SUBTYPE.....	LATCHING
VENDOR.....	035, MOOG SPACE PRODUCTS DIVISION
VENDOR PART NUMBER.....	53-159
MARTIN MARIETTA PART NUMBER.....	-0-
QUALIFICATION STATUS.....	-0-
PAST APPLICATIONS.....	HUGHES, BAE, ERNO, QUAL. PROGRAMS
PRINCIPAL MATERIAL OF CONSTRUCTION.....	CRES 300
SEAL MATERIAL.....	-0-
SEAT MATERIAL.....	-0-
OPERATING PRESSURE (PSIG).....	300.000
PROOF PRESSURE (PSIG).....	-0-
BURST PRESSURE (PSIG).....	-0-
CRACKING PRESSURE (PSID).....	-0-
RESEAT PRESSURE (PSID).....	-0-
CHECK PRESSURE (PSID).....	140.000
MAXIMUM OPERATING TEMPERATURE (F).....	-30.0000
MINIMUM OPERATING TEMPERATURE (F).....	-0-
THERMAL CYCLES (CYCLES).....	-0-
CYCLE TEMPERATURES (RANGE, F).....	0.25000
INLET PORT SIZE (IN).....	0.25000
OUTLET PORT SIZE (IN).....	5.00000
PRESSURE DROP (PSID).....	0.5 LB/SEC
FLOW RATE.....	-0-
PRESSURE DROP TEST FLUID.....	-0-
Cv (FLOW FACTOR).....	1.8 SCC/HR H ₂ @ 300 PSI
INTERNAL LEAKAGE.....	.018 SCC/HR N ₂ @ 300 PSI
EXTERNAL LEAKAGE.....	-0-
MAXIMUM CONTAMINATE ALLOWED (MICRONS).....	-0-
VIBRATION LIMITS (GRMS).....	-0-
VIBRATION DURATION (MIN/AXIS).....	-0-
SHOCK LIMITS (G's).....	20.0000
METHOD OF ACTUATION.....	-0-
POWER REQUIREMENT.....	13 WATTS 15.3 VDC
LATCHING MECHANISM.....	-0-
NORMAL STATUS (OPEN OR CLOSED).....	-0-
OPEN RESPONSE TIME (MSEC).....	-0-
CLOSE RESPONSE TIME (MSEC).....	-0-
WEIGHT (LBF).....	0.50000
LIFETIME (YEARS).....	10.0000
CYCLE LIFE (CYCLES).....	30000.0
MTBF (HOURS).....	-0-
LEAD TIME (WEEKS).....	-0-
COMPATIBLE FLUIDS.....	15, 21, 01, 04, 26
ENVELOPE.....	1.4 IN. X 4.8 IN. X 3.94 IN.
COMMENTS.....	-0-
PRODUCTION COST.....	-0-
DESIGN AND DEVELOPMENT COST.....	-0-
STATE OF ART.....	-0-
COMPLEXITY FACTOR.....	-0-

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COMPONENT DATA SHEET 145

VALVE DATA REPORT / DATA ENTRY DATE: 04/28/87

TYPE.....	SOLENOID
SUBTYPE.....	NORMALLY CLOSED
VENDOR.....	004, AMETEK, STRAZA DIVISION
VENDOR PART NUMBER.....	435
MARTIN MARIETTA PART NUMBER.....	-0-
QUALIFICATION STATUS.....	COMPLETE
PAST APPLICATIONS.....	SATURN II
PRINCIPAL MATERIAL OF CONSTRUCTION.....	2024-T4 ALUM & CRES
SEAL MATERIAL.....	BUNA "N"
SEAT MATERIAL.....	18-8/303 CRES
OPERATING PRESSURE (PSIG).....	3000.00
PROOF PRESSURE (PSIG).....	4500.00
BURST PRESSURE (PSIG).....	7500.00
CRACKING PRESSURE (PSID).....	-0-
RESEAT PRESSURE (PSID).....	-0-
CHECK PRESSURE (PSID).....	-0-
MAXIMUM OPERATING TEMPERATURE (F).....	165.000
MINIMUM OPERATING TEMPERATURE (F).....	-65.0000
THERMAL CYCLES (CYCLES).....	-0-
CYCLE TEMPERATURES (RANGE, F).....	-0-
INLET PORT SIZE (IN).....	0.25000
OUTLET PORT SIZE (IN).....	0.25000
PRESSURE DROP (PSID).....	-0-
FLOW RATE.....	EQ. DIA. = 0.100 IN.
PRESSURE DROP TEST FLUID.....	-0-
Cv (FLOW FACTOR).....	-0-
INTERNAL LEAKAGE.....	0.05 SCIM @ 70F & 0-3000 PSI
EXTERNAL LEAKAGE.....	ZERO
MAXIMUM CONTAMINATE ALLOWED (MICRONS).....	-0-
VIBRATION LIMITS (GRMS).....	-0-
VIBRATION DURATION (MIN/AXIS).....	-0-
SHOCK LIMITS (G's).....	15.0000
METHOD OF ACTUATION.....	SOLENOID
POWER REQUIREMENT.....	18-32 VDC
LATCHING MECHANISM.....	-0-
NORMAL STATUS (OPEN OR CLOSED).....	CLOSED
OPEN RESPONSE TIME (MSEC).....	50.0000
CLOSE RESPONSE TIME (MSEC).....	50.0000
WEIGHT (LBF).....	1.50000
LIFETIME (YEARS).....	-0-
CYCLE LIFE (CYCLES).....	1800.00
MTBF (HOURS).....	-0-
LEAD TIME (WEEKS).....	01
COMPATIBLE FLUIDS.....	42
ENVELOPE.....	5.5 IN. X 1.906 IN. X 2.312 IN.
COMMENTS.....	-0-

PRODUCTION COST.....	-0-
DESIGN AND DEVELOPMENT COST.....	-0-
STATE OF ART.....	-0-
COMPLEXITY FACTOR.....	-0-

VALVE DATA REPORT / DATA ENTRY DATE: 04/14/87

TYPE..... SOLENOID
 SUBTYPE..... -0-
 VENDOR..... 075, WRIGHT COMPONENTS, INC.
 VENDOR PART NUMBER..... 15751
 MARTIN MARIETTA PART NUMBER..... N/A
 QUALIFICATION STATUS..... QUALIFIED
 PAST APPLICATIONS..... SATELLITE
 PRINCIPAL MATERIAL OF CONSTRUCTION..... CRES
 SEAL MATERIAL..... FLUOROSILICONE/METAL
 SEAT MATERIAL..... FLUOROSILICONE
 OPERATING PRESSURE (PSIG)..... 75.0000
 PROOF PRESSURE (PSIG)..... 200.000
 BURST PRESSURE (PSIG)..... 250.000
 CRACKING PRESSURE (PSID)..... -0-
 RESEAT PRESSURE (PSID)..... -0-
 CHECK PRESSURE (PSID)..... -0-
 MAXIMUM OPERATING TEMPERATURE (F)..... 150.000
 MINIMUM OPERATING TEMPERATURE (F)..... -80.0000
 THERMAL CYCLES (CYCLES)..... -0-
 CYCLE TEMPERATURES (RANGE, F)..... -0-
 INLET PORT SIZE (IN)..... 0.37500
 OUTLET PORT SIZE (IN)..... 0.37500
 PRESSURE DROP (PSID)..... -0-
 FLOW RATE..... -0-
 PRESSURE DROP TEST FLUID..... -0-
 Cv (FLOW FACTOR)..... 2 SCCH HE MAX
 INTERNAL LEAKAGE..... 2 SCCH HE MAX
 EXTERNAL LEAKAGE..... -0-
 MAXIMUM CONTAMINATE ALLOWED (MICRONS)..... -0-
 VIBRATION LIMITS (GRMS)..... -0-
 VIBRATION DURATION (MIN/AXIS)..... -0-
 SHOCK LIMITS (G's)..... -0-
 METHOD OF ACTUATION..... SOLENOID
 POWER REQUIREMENT..... 28 +1/-4 VDC
 LATCHING MECHANISM..... -0-
 NORMAL STATUS (OPEN OR CLOSED)..... CLOSED
 OPEN RESPONSE TIME (MSEC)..... 20.0000
 CLOSE RESPONSE TIME (MSEC)..... 20.0000
 WEIGHT (LBF)..... 0.60000
 LIFETIME (YEARS)..... -0-
 CYCLE LIFE (CYCLES)..... 500000.
 MTBF (HOURS)..... -0-
 LEAD TIME (WEEKS)..... -0-
 COMPATIBLE FLUIDS..... 01, 04
 ENVELOPE.... 2.8 IN. X 2.0 IN. X 1.8 IN. (APPROX.)
 COMMENTS..... LOW LEVEL THRUST VALVE - 0.05 LBF

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PRODUCTION COST..... -0-
 DESIGN AND DEVELOPMENT COST..... -0-
 STATE OF ART..... -0-
 COMPLEXITY FACTOR..... -0-

VALVE DATA REPORT / DATA ENTRY DATE: 06/03/87

TYPE..... TORQUE MOTOR
 SUBTYPE..... LATCHING
 VENDOR..... 035, MOOG SPACE PRODUCTS DIVISION
 VENDOR PART NUMBER..... 52-178
 MARTIN MARIETTA PART NUMBER..... -0-
 QUALIFICATION STATUS..... YES
 PAST APPLICATIONS..... LEASAT
 PRINCIPAL MATERIAL OF CONSTRUCTION..... -0-
 SEAL MATERIAL..... -0-
 SEAT MATERIAL..... 400.000
 OPERATING PRESSURE (PSIG)..... 600.000
 PROOF PRESSURE (PSIG)..... 1600.00
 BURST PRESSURE (PSIG)..... 200.000
 CRACKING PRESSURE (PSID)..... -0-
 RESEAT PRESSURE (PSID)..... -0-
 CHECK PRESSURE (PSID)..... 170.000
 MAXIMUM OPERATING TEMPERATURE (F)..... 10.0000
 MINIMUM OPERATING TEMPERATURE (F)..... -0-
 THERMAL CYCLES (CYCLES)..... -0-
 CYCLE TEMPERATURES (RANGE, F)..... 0.37500
 INLET PORT SIZE (IN)..... 0.37500
 OUTLET PORT SIZE (IN)..... 1.00000
 PRESSURE DROP (PSID)..... 0.04 LB/SEC
 FLOW RATE..... WATER
 PRESSURE DROP TEST FLUID..... -0-
 Cv (FLOW FACTOR)..... 50/5 SCC/HR GN2 @ 25/225 PSIG
 INTERNAL LEAKAGE..... 1.0E-6 SCC/SEC GHE @ 400 PSIG
 EXTERNAL LEAKAGE..... -0-
 MAXIMUM CONTAMINATE ALLOWED (MICRONS)..... 17.6000
 VIBRATION LIMITS (GRMS)..... -0-
 VIBRATION DURATION (MIN/AXIS)..... -0-
 SHOCK LIMITS (G's)..... -0-
 METHOD OF ACTUATION..... 27 WATTS 27 VDC
 POWER REQUIREMENT..... -0-
 LATCHING MECHANISM..... -0-
 NORMAL STATUS (OPEN OR CLOSED)..... 50.0000
 OPEN RESPONSE TIME (MSEC)..... 50.0000
 CLOSE RESPONSE TIME (MSEC)..... 1.70000
 WEIGHT (LBF)..... -0-
 LIFETIME (YEARS)..... 1000.00
 CYCLE LIFE (CYCLES)..... -0-
 MTBF (HOURS)..... -0-
 LEAD TIME (WEEKS)..... 15
 COMPATIBLE FLUIDS.....
 ENVELOPE..... 4.8 IN. X 6.0 IN. X 1.7 IN. (APPROX.)
 COMMENTS..... MONOPROPELLANT
 PRODUCTION COST..... -0-
 DESIGN AND DEVELOPMENT COST..... -0-
 STATE OF ART..... -0-
 COMPLEXITY FACTOR..... -0-

COMPONENT DATA SHEET 148

VALVE DATA REPORT / DATA ENTRY DATE: 04/14/87

TYPE.....	SOLENOID
SUBTYPE.....	-0-
VENDOR.....	075, WRIGHT COMPONENTS, INC.
VENDOR PART NUMBER.....	15975
MARTIN MARIETTA PART NUMBER.....	N/A
QUALIFICATION STATUS.....	-0-
PAST APPLICATIONS.....	-0-
PRINCIPAL MATERIAL OF CONSTRUCTION.....	-0-
SEAL MATERIAL.....	AF-E-411
SEAT MATERIAL.....	450.000
OPERATING PRESSURE (PSIG).....	920.000
PROOF PRESSURE (PSIG).....	1820.00
BURST PRESSURE (PSIG).....	-0-
CRACKING PRESSURE (PSID).....	-0-
RESEAT PRESSURE (PSID).....	-0-
CHECK PRESSURE (PSID).....	-0-
MAXIMUM OPERATING TEMPERATURE (F).....	170.000
MINIMUM OPERATING TEMPERATURE (F).....	40.0000
THERMAL CYCLES (CYCLES).....	-0-
CYCLE TEMPERATURES (RANGE, F).....	-0-
INLET PORT SIZE (IN).....	0.50000
OUTLET PORT SIZE (IN).....	-0-
PRESSURE DROP (PSID).....	60.0000
FLOW RATE.....	0.80 LBM/SEC
PRESSURE DROP TEST FLUID.....	HYDRAZINE @ 70F
Cv (FLOW FACTOR).....	-0-
INTERNAL LEAKAGE.....	3 SCCH GN2 @ 70 - 450 PSIA
EXTERNAL LEAKAGE.....	1 X 10***-6 SCCS GHE @ 450 PSIG
MAXIMUM CONTAMINATE ALLOWED (MICRONS).....	-0-
VIBRATION LIMITS (GRMS).....	-0-
VIBRATION DURATION (MIN/AXIS).....	-0-
SHOCK LIMITS (G's).....	-0-
METHOD OF ACTUATION.....	SOLENOID
POWER REQUIREMENT.....	21-35 VDC
LATCHING MECHANISM.....	-0-
NORMAL STATUS (OPEN OR CLOSED).....	CLOSED
OPEN RESPONSE TIME (MSEC).....	12.0000
CLOSE RESPONSE TIME (MSEC).....	12.0000
WEIGHT (LBF).....	1.50000
LIFETIME (YEARS).....	-0-
CYCLE LIFE (CYCLES).....	100000.
MTBF (HOURS).....	-0-
LEAD TIME (WEEKS).....	-0-
COMPATIBLE FLUIDS.....	15, 01, 04, 26, 21
ENVELOPE.....	-0-
COMMENTS.....	-0-
PRODUCTION COST.....	-0-
DESIGN AND DEVELOPMENT COST.....	-0-
STATE OF ART.....	-0-
COMPLEXITY FACTOR.....	-0-

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VALVE DATA REPORT / DATA ENTRY DATE: 04/29/87

TYPE.....	SOLENOID
SUBTYPE.....	PILOT OPERATED
VENDOR.....	004, AMETEK, STRAZA DIVISION
VENDOR PART NUMBER.....	525-503
MARTIN MARIETTA PART NUMBER.....	PD47S0153
QUALIFICATION STATUS.....	COMPLETE
PAST APPLICATIONS.....	TITAN III
PRINCIPAL MATERIAL OF CONSTRUCTION.....	17-4PH CRES
SEAL MATERIAL.....	-0-
SEAT MATERIAL.....	-0-
OPERATING PRESSURE (PSIG).....	3700.00
PROOF PRESSURE (PSIG).....	5550.00
BURST PRESSURE (PSIG).....	9250.00
CRACKING PRESSURE (PSID).....	-0-
RESEAT PRESSURE (PSID).....	-0-
CHECK PRESSURE (PSID).....	-0-
MAXIMUM OPERATING TEMPERATURE (F).....	160.000
MINIMUM OPERATING TEMPERATURE (F).....	-120.000
THERMAL CYCLES (CYCLES).....	-0-
CYCLE TEMPERATURES (RANGE, F).....	-0-
INLET PORT SIZE (IN).....	1.00000
OUTLET PORT SIZE (IN).....	1.00000
PRESSURE DROP (PSID).....	-0-
FLOW RATE.....	0.285 LBM/SEC
PRESSURE DROP TEST FLUID.....	GHE @ 3600 PSIA & 75F
Cv (FLOW FACTOR).....	-0-
INTERNAL LEAKAGE.....	16.6 SCFM MAX
EXTERNAL LEAKAGE.....	10 SCCH MAX
MAXIMUM CONTAMINATE ALLOWED (MICRONS).....	-0-
VIBRATION LIMITS (GRMS).....	-0-
VIBRATION DURATION (MIN/AXIS).....	-0-
SHOCK LIMITS (G's).....	-0-
METHOD OF ACTUATION.....	SOLENOID
POWER REQUIREMENT.....	25 VDC
LATCHING MECHANISM.....	-0-
NORMAL STATUS (OPEN OR CLOSED).....	-0-
OPEN RESPONSE TIME (MSEC).....	27.0000
CLOSE RESPONSE TIME (MSEC).....	40.0000
WEIGHT (LBF).....	2.20000
LIFETIME (YEARS).....	-0-
CYCLE LIFE (CYCLES).....	50000.0
MTBF (HOURS).....	-0-
LEAD TIME (WEEKS).....	42
COMPATIBLE FLUIDS.....	04
ENVELOPE.....	4.00 IN. X 4.00 IN. X 2.687 IN. (APPROX)
COMMENTS.....	-0-

PRODUCTION COST.....	-0-
DESIGN AND DEVELOPMENT COST.....	-0-
STATE OF ART.....	-0-
COMPLEXITY FACTOR.....	-0-

VALVE DATA REPORT / DATA ENTRY DATE: 05/12/87

TYPE..... MANUAL
 SUBTYPE..... SERVICE
 VENDOR..... 072, VACCO INDUSTRIES
 VENDOR PART NUMBER..... V1E10330-01
 MARTIN MARIETTA PART NUMBER..... -0-
 QUALIFICATION STATUS..... -0-
 PAST APPLICATIONS..... G.E.
 PRINCIPAL MATERIAL OF CONSTRUCTION..... TITANIUM
 SEAL MATERIAL..... ETHYLENE PROPYLENE
 SEAT MATERIAL..... TUNGSTEN & 17-4 PH
 OPERATING PRESSURE (PSIG)..... 4500.00
 PROOF PRESSURE (PSIG)..... 6750.00
 BURST PRESSURE (PSIG)..... 18000.0
 CRACKING PRESSURE (PSID)..... -0-
 RESEAT PRESSURE (PSID)..... -0-
 CHECK PRESSURE (PSID)..... -0-
 MAXIMUM OPERATING TEMPERATURE (F)..... 140.000
 MINIMUM OPERATING TEMPERATURE (F)..... -40.0000
 THERMAL CYCLES (CYCLES)..... -0-
 CYCLE TEMPERATURES (RANGE, F)..... -0-
 INLET PORT SIZE (IN)..... 0.50000
 OUTLET PORT SIZE (IN)..... 0.37500
 PRESSURE DROP (PSID)..... -0-
 FLOW RATE..... 0.3 PPS
 PRESSURE DROP TEST FLUID..... H2O
 Cv (FLOW FACTOR)..... -0-
 INTERNAL LEAKAGE..... -0-
 EXTERNAL LEAKAGE..... -0-
 MAXIMUM CONTAMINATE ALLOWED (MICRONS)..... -0-
 VIBRATION LIMITS (GRMS)..... -0-
 VIBRATION DURATION (MIN/AXIS)..... -0-
 SHOCK LIMITS (G's)..... -0-
 METHOD OF ACTUATION..... MANUAL
 POWER REQUIREMENT..... -0-
 LATCHING MECHANISM..... -0-
 NORMAL STATUS (OPEN OR CLOSED)..... -0-
 OPEN RESPONSE TIME (MSEC)..... -0-
 CLOSE RESPONSE TIME (MSEC)..... -0-
 WEIGHT (LBF)..... 2.00000
 LIFETIME (YEARS)..... -0-
 CYCLE LIFE (CYCLES)..... -0-
 MTBF (HOURS)..... -0-
 LEAD TIME (WEEKS)..... -0-
 COMPATIBLE FLUIDS..... 01,04,21,26,35
 ENVELOPE..... L = 5.65 IN.; DIA. = 2.0 IN.
 COMMENTS..... TUBE OUT; MS33656-8 IN.

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PRODUCTION COST..... -0-
 DESIGN AND DEVELOPMENT COST..... -0-
 STATE OF ART..... -0-
 COMPLEXITY FACTOR..... -0-